

2 Devising fair and effective technology-export controls

Talbot S. Lindstrom

Recognizing the Soviets' quantitative military advantage, the U.S. and its allies are striving to maintain a qualitative edge. Critical to this effort is the protection of Western high technology. Outlining the West's export control program, this article explains the rationale for regulating technology transfer, describes ongoing initiatives to frustrate Soviet acquisition of this technology, and spotlights the difficulties of formulating policies that adequately protect national security yet do not unfairly restrict free enterprise.

8 Checks on technology transfer: the defense stakes are high

Arthur F. Van Cook

Soviet bloc nations, which have often been able to acquire U.S. high technology with military applications, are continuing their efforts unabated and pose a serious threat to our national security interests. The Congress, the administration, and the Defense Department recognize the dangers and are taking action to control the outflow of militarily useful technology. The author of this article discusses damage already done, reviews the complex and sensitive issues involved, and outlines initiatives under way to address the problem.

16 Lifting limits on end strength: results of a DoD experiment

Larry W. Lacy

Personnel end-strength ceilings are necessary to curb the growth of federal payrolls—true or false? In the case of the Defense Department's industrial fund activities, false. To test the premise, Congress temporarily lifted year-end caps on the number of civilians working at those facilities. During the FY 1983 test period, employment levels remained stable, installations saved millions of dollars, and personnel management, training practices, and recruiting improved as well. The author describes the details of the experiment in this article.

23 The strengths and weaknesses of multiyear contracting

Major Danton G. Steele II, USA

Annual contracting, that is, budgeting enough money to satisfy one year's procurement requirements, is coming under increasing scrutiny as an approach to defense acquisition. It contributes to program instability, which in turn leads to reduced competition and a weakened defense industrial base. This article considers wider use of multiyear procurement as an alternative to annual arrangements. The author outlines circumstances under which multiyear contracting is appropriate and discusses its potential benefits to the government.

28 Forecasting the economic impact of major defense acquisitions

*Brigadier General Gordon E. Fornell, USAF
and
Lieutenant Colonel Glenn H. Vogel, USAF*

When decision-makers give the go-ahead for acquisition of a major new weapon system, their primary goal is to strengthen our national security. But procurement of such a system also has important economic consequences, and knowing what they are can greatly aid policy-makers and planners. The Defense Economic Impact Modeling System offers a tool useful in assessing those consequences, and this article illustrates some of its applications by reference to the planned procurement of the Peacekeeper missile system.

35 Departments

Report synopses: the General Accounting Office suggests ways to cut B-1B support costs; the Human Resources Research Organization compares the military suitability of diploma and nondiploma graduates. **Federal personnel manager:** DMJ legal columnist Stephen A. Klatsky counsels managers to anticipate employee appeals when considering disciplinary action. **Readership survey:** readers respond in record numbers, and DMJ reports on the results. **News summary:** Carnegie-Mellon will operate DoD software institute, and more.

technology-export controls

By TALBOT S. LINDSTROM

As the number of commodities incorporating technology with both civilian and military applications increases, so too does the need for well-conceived, pragmatic export controls.

Much has been written lately about controlling the export of high technology to the communist bloc. While the writers have been well-meaning, many of them have missed the mark because of a basic misunderstanding concerning the true nature of export control. In order to fully appreciate the issues involved, one must understand the underlying rationale for export control. What is the problem? What is the government doing about it? And why?

The fundamental reason for controlling high-technology exports is to maintain the West's military lead. If that lead is not maintained, we will have to try to compete with the Soviet bloc man-for-man and gun-for-gun. The Warsaw Pact maintains a much larger standing army than does the Western Alliance and enjoys a significant numerical advantage both in personnel and materiel. To counter this force on its own terms would require substantial increases in the military budgets of the alliance.

Instead, we have chosen to build our deterrence on superiority in technology—to design and build equipment that outperforms the competition. To increase the leverage of our defense dollars we are using fewer people and equipping them with weapon systems that are better than those of our potential adversaries.

The United States, for example, has already fielded sophisticated C³I systems that utilize networks of small, ruggedized microcomputers for real-time targeting and battlefield reconnaissance. The Soviets, because of their lag in microelectronic production technology, have been unable to make extensive use of such microcomputers.

In fact, a recent article in *Byte* magazine noted that the Soviet Union is still producing inferior microcomputers based on older American designs.¹

Similarly, the superiority of Western combat aircraft in both thrust-to-weight ratio and the reliability of high-performance jet engines, due in part to advances in metallurgy, gives us a significant operational advantage in tactical air warfare. Soviet acquisition of this technology would greatly reduce that advantage.

So far, the West has managed to stay a few years ahead of the Soviets in deployed technology, but this lead is vulnerable due to several factors. Our time line for weapon systems development is one of these. The period of time from beginning of development to actual deployment in the field can be as long as ten years, and a useful deployed life of 20 additional years is not unusual. The fruits of this long-term investment are seriously jeopardized if our potential adversaries obtain a system's technology early in its development or test cycle.

The changing relationship between civilian and military technologies also makes our lead vulnerable. Thirty years ago, military technology was far ahead of that in the private sector; sophisticated military electronics had no civilian counterpart. Today, the situation is very different. We increasingly find that military systems incorporate technology which is already in the civilian marketplace. The microelectronics revolution, for ex-

¹Ruth Heuertz, "Soviet Microprocessors and Microcomputers," *Byte*, April 1984, pp. 351-362.

viet acquisition.

The pluralistic makeup of Western society represents a third area of vulnerability. The allies' use of advanced technology in weapon systems is subject to multilateral negotiations and mutual agreement among the Atlantic partners. As a result, progress in modernizing NATO forces is sometimes agonizingly slow and this pace affords the Soviets time to narrow the technological gap.

Also threatening our technological lead is a massive Soviet program, directed from the highest levels of the Kremlin, to acquire Western military technology at any cost and by any and all means. Testifying before the U.S. Senate Permanent Subcommittee on Investigations in 1982, William Casey, Director of the Central Intelligence Agency, reported:

The KGB has developed a large, independent, specialized organization which does nothing but work on getting access to Western science and technology. They have been recruiting about 100 young scientists and engineers a year for the last 15 years. They roam the world looking for technology to pick up. Back in Moscow there are 400 to 500 assessing what they might need and where they might get it—doing their targeting and then assessing what they get. It's a very sophisticated and far-flung operation.

A recent *Jerusalem Post* article provided additional information on Soviet efforts in this area.² It quotes Jewish emigres who stated that the Soviets have bought entire factories from the West to obtain otherwise restricted commodities, in one instance purchasing a ball-point pen factory in the U.S. in order to obtain the ball-bearing technology needed to make gyroscopes for rocket-guidance systems. According to the emigres, hardly a single Soviet engineer or technologist goes abroad on business without first being briefed and given some intelligence assignment by the KGB.

Several cases of illegal diversion by the Soviets have made the headlines. One of these took place in late 1983, when a cooperative effort by the United States, Germany, and Sweden resulted in the seizure of more than forty tons of high-technology information-processing equipment illegally bound for the Soviet Union. The equipment, exported from the United States under a variety of individual and bulk-export licenses, was being routed through a maze of free-world coun-

carefully steer a course between two extremes. On the one hand, we must not restrict technology exchange to such an extent that we actually slow the pace of Western technological development. On the other hand, we cannot be so cavalier in the face of Soviet success that we in effect throw up our hands and do nothing. Like many difficult real-world problems, control of technology transfer is within the realm of the possible; it requires a pragmatic approach that balances the competing policy considerations and also optimizes the benefit-cost ratio.

We need to realize that we can increase our technological lead in two ways—by moving the West farther ahead and by holding the Soviets back. Recognizing this fact, the Reagan administration has adopted an approach of promoting technology exchange and development with our friends and allies while at the same time restricting technology transfer to potential adversaries. These activities complement each other; neither can succeed alone.

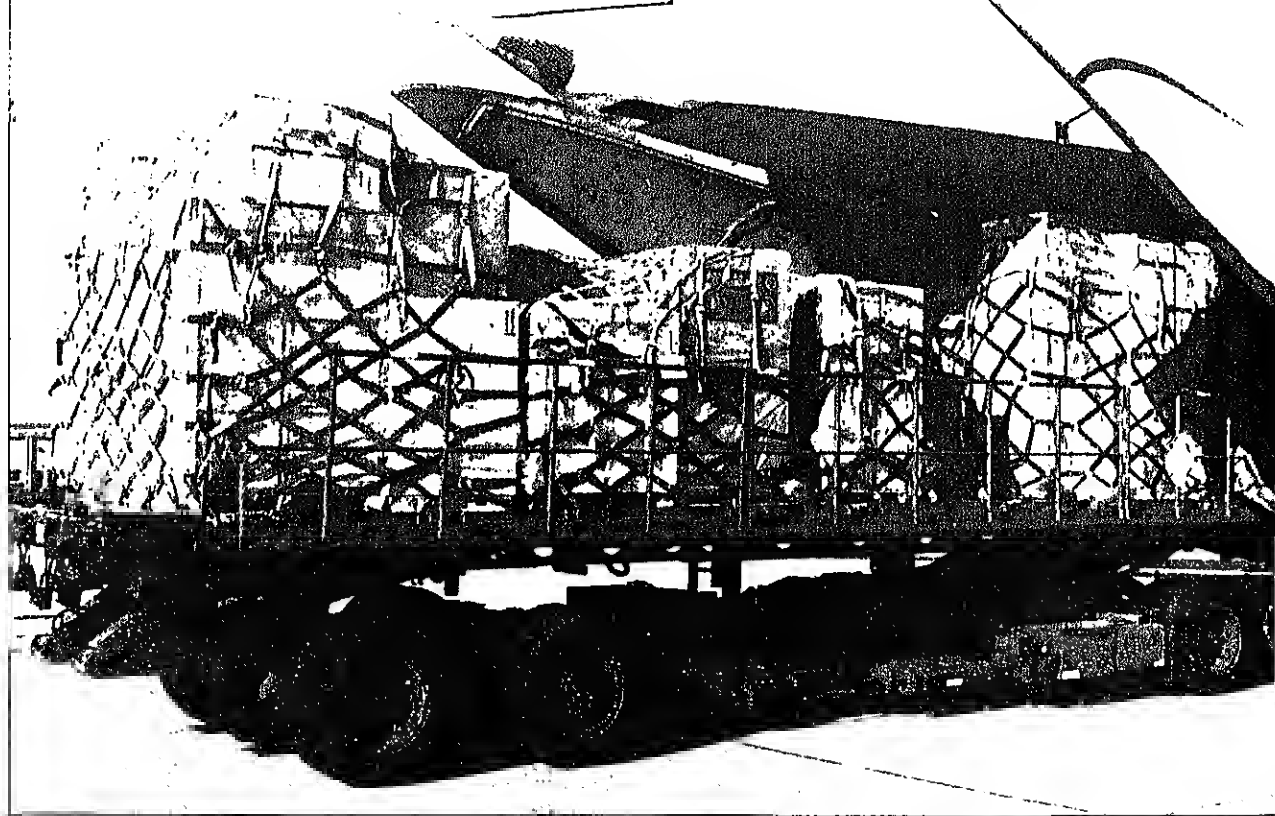
President Reagan stated the U.S. position on sharing technology within the Western Alliance in July 1981. He emphasized that this nation's policy is to encourage conventional arms transfers and coproduction arrangements, help our allies and friendly nations strengthen their military and industrial base capabilities, and foster regional and national security goals and objectives. In carrying out this policy, Secretary of Defense Caspar W. Weinberger and NATO Ambassador David Abshire have initiated or proposed several major cooperative measures, including programs for achieving conventional force multiplier effects through the exploitation of emerging technologies.

The United States has also undertaken initiatives designed to restrict the flow of militarily critical technology to potential adversaries. They constitute a realistic course of action rather than one based on popular myths about technology transfer. Thus they recognize that, for a number of reasons, it is impossible to prevent all undesirable technology transfer. Some transfer occurs and will continue to occur illegally. An open society, which is absolutely essential to our continued scientific and technological progress, creates some targets of opportunity for the Soviets that we can never fully protect.

The objective of export controls, then, is delay, not

²Victor Perry, "Soviets Busy Hijacking Western High Technology," *Jerusalem Post*, May 11, 1984.

³Caspar W. Weinberger, *The Technology Transfer Control Program: A Report to the 98th Congress, Second Session, U.S. Department of Defense, Washington, DC, February 1984*, pp.56-58.



Workers unload part of the 10 tons of computers with militarily critical technology that were seized in Operation Exodus by U.S. and German Customs officials; at right, Robert Rosen of Harry Diamond Labs examines a central processing unit highly coveted by the Soviets.

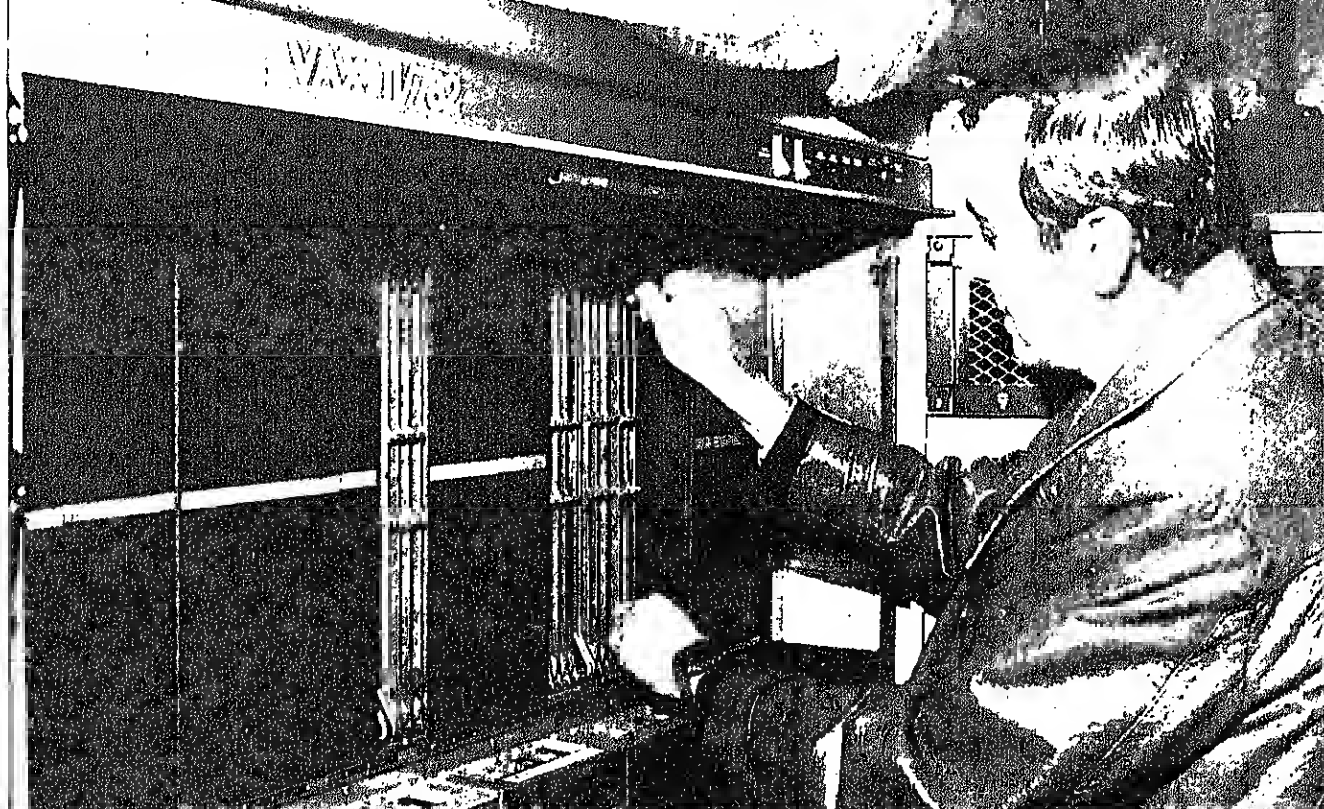
prevention. Though high technology has a short useful life, during that life, we want to make the know-how as difficult as possible for the Soviets to obtain. If they do succeed, we want to make the effort as costly as possible. Let the Soviets expend their own resources to acquire high technology rather than get it from the West at a fraction of what it cost us to research it, develop it, engineer it, figure out how to manufacture it, and control its quality. The West will be better able to maintain its advantage if the already resource-limited Soviet economy has to bear the full economic brunt of technological innovations.

Another widely held misconception is that the United States has a monopoly on technology. Save in a few areas, we do not. Therefore, if controls are to be effective, they must be multinational in those areas where we do not have a monopoly. Otherwise, American industry

Finally, our export control efforts acknowledge that the United States, as a practical matter, cannot police all activity. Consequently, they concentrate the government's limited resources on those areas offering the highest potential payoff.

Two implicit policy objectives underlie the administration's approach to restricting technology flow to the Soviets. One is more effective control mechanisms at the international, national, and agency levels. The other is minimization of adverse effects on American business. Three principles—fairness, predictability, and participation—have guided policy-makers in working toward this latter objective.

In the interest of fairness, American industry must not be put at a disadvantage in the world marketplace and controls must be updated regularly to reflect current states-of-the-art. Predictability requires a common, consistently enforced, government-wide policy, and prompt, uniform export-license processing. Participation means full industry involvement in policy-making and the resolution of problems through cooperation, not confrontation.



PHOTOS BY ED UDANKO

tary and civilian applications—the administration has made revival of the Coordinating Committee for Multilateral Security Export Controls, or COCOM, one of its top priorities. COCOM is an international control organization formed after World War II; its members include all NATO countries (except Iceland and Spain) and Japan. Four years ago, COCOM was moribund from years of neglect, but since then it has become an effective control mechanism.

Recently, for example, the committee completed its review of a list of commodities and technologies for which export protection might be appropriate. Members concluded that review, capped by a new agreement on computers, on terms that neither handicap industry nor compromise Western security. Low-level computers of limited strategic application are to be exempt from embargo, thus enabling U.S. computer manufacturers to compete equally with their foreign counterparts. Conversely, the accord places a membership-wide prohibition against exportation of ruggedized computers, superminis, and large mainframes.

By bringing software under specific embargo for the first time, the new list places U.S. software manufacturers

mainly used business software, will be free from control. But all COCOM members equally will prohibit export of certain types of software with strategic applications.

The committee also established tougher controls on digital communications switches. Although the United States has long embargoed these switches, other Western industrial countries are now following suit as well. In the summer of 1984, for example, European firms withdrew bids to provide Bulgaria with sophisticated central telephone networks, which communist bloc countries often use for military command-and-control.

COCOM has also achieved a major breakthrough in the control of strategic technology. Up until now, when an item was decontrolled, so too was the technology used to make it. But because COCOM nations have agreed to embargo the technology for manufacturing even unembargoed computers, the U.S. has been able to ease controls on much higher levels of end products. This revised policy protects against the release of technology, yet affords companies an opportunity to market certain items that previously would have been controlled. The new approach derives largely from a 1976

and in addition to its work with COCOM, the administration has undertaken a major initiative involving cooperation between the U.S. and the People's Republic of China on matters relating to military technology. As Dr. James P. Wade Jr., the interim Under Secretary of Defense for Research and Engineering, recently explained at a Pentagon conference of representatives from aerospace and electronics industries, "We now consider the People's Republic of China to be a friendly but non-allied country and are interested in assisting it to modernize its armed forces to improve its defensive capabilities." He added, "Joint participation by the United States and the People's Republic of China in programs using U.S. technology to modernize their armed forces is to our mutual benefit."

While noting the relaxation in export restrictions, Dr. Wade also stated that sale of certain controlled items and technologies continues to require COCOM review and approval and that no major official relaxation toward the People's Republic of China by COCOM is expected. "We do not intend to undermine this important multinational body," he said.

In order to effectively support our international efforts, the administration has reorganized the federal government's export control network. Not surprisingly, federal agencies have different points of view on technology control, largely due to the differing nature of their missions. The Department of Commerce is responsible for promoting exports; the concern of the State Department is relations with foreign governments; the Customs Service is charged with policing our borders; and the Department of Defense has responsibility for ensuring our military security. These varying perspectives, coupled with input from the private sector, are the ingredients that must be blended if we are to formulate a successful national policy. To harness these assets, the administration has provided a consistent common objective, as described above, and put in place a number of formal mechanisms for integrating divergent viewpoints.

One such mechanism is a series of interagency committees, from the working level up to the secretariat level, established to resolve differences of opinion. This hierarchy of committees facilitates problem resolution at the lowest possible level and ensures that only the most difficult problems are escalated to higher management

levels, up to and including the president. Another new working group, the Technology Transfer Intelligence Committee, brings together all agencies that generate or use technology transfer intelligence information.

While the government is the only source of national security information, industry is the better source of information on the technological marketplace, including state-of-the-art developments and foreign competition. Consequently, the administration has also set up industry-government committees to formally participate in all phases of export control policy-making, both at the open and classified levels. These technical working groups and advisory committees provide a necessary private-sector contribution to government policy-making.

Exporters are also participating much more than they used to in export license decision-making. Informal conferences between technical representatives of exporting firms and the government are helping to resolve differences between the two. These conferences frequently lead to an approval with mutually acceptable conditions and restrictions rather than to an outright denial. DoD's policy is to try to find a way to permit export yet protect national security interests. The Defense Department fully appreciates the importance of a dynamic, healthy American industrial base, which this policy helps promote.

In addition to improving export control policy-making, the United States has strengthened enforcement of its policies. For example, we have come to recognize that it is unfair to ask law-abiding American companies to restrict their high-technology exports to the Soviet bloc when fly-by-night operations can readily evade export control laws. We have therefore stepped up efforts to stem illegal exportation.

One such initiative is Operation Exodus, which brings the full power, experience, resources, and international contacts of the U.S. Customs Service to the support of the Commerce Department's Export Enforcement Branch. To date, the operation has been extremely successful. Highly publicized seizures of items such as the VAX computers in Germany and Sweden, as well as less-publicized but equally effective contraband seizures, are causing the Soviet Union to work much harder, but with much less success, to obtain Western technology.

In response to some early criticism that Operation Exodus was leading to indiscriminate seizures, the Customs Service launched a target and education pro-

The Department of Defense has also been striving to amend and update export controls so that they protect only the most critical technologies and free lower-level technology from unnecessary restrictions. To this end, DoD, with help from industry, is revising the Military Critical Technologies List, a three-inch-thick document that describes 18 militarily critical areas of technology. Because of its size, the list is sometimes criticized by those who do not fully understand its purpose. It is not a control mechanism per se but rather a reference document that sets forth the rationale for controlling crucial elements of each technology. As a guide for modifying the actual legal document—the Commodity Control List—it necessarily contains much information. The Military Critical Technologies List is also classified, and that has given rise to some of the misunderstanding; recently, DoD released an unclassified version.

The Defense Department is putting its own house in order too. The secretary of defense issued a new policy directive, DoDD 2040.2, "International Transfers of Technology, Goods, Services, and Munitions," which formally assigns responsibilities within the department for various aspects of technology transfer. It calls for the establishment of senior-level technology transfer panels and subpanels to formulate department-wide policies that take into account the views of all DoD components.

Another major internal effort is the department's implementation of the automated Foreign Disclosure and Technical Information System. It provides on-line tracking of export-license case processing and serves as a reference data base for DoD case processors. Other federal agencies, including the Commerce and State Departments, will soon have access to the system as well.

Recognizing industry's right to have export license requests processed promptly and fairly, all federal agencies involved in export license processing have attempted to shorten processing time. DoD recently took a series of steps to cut its processing time in half. Under the revamped procedures, a team of technical experts from the international programs and technology office (office of the under secretary of defense for research and engineering) and policy experts from the office of international economic trade and security policy (office of the under secretary of defense for policy) examines a case within three days of receipt. At this point, DoD can immediately approve or deny a substantial number of cases and report its position to the Department of Com-

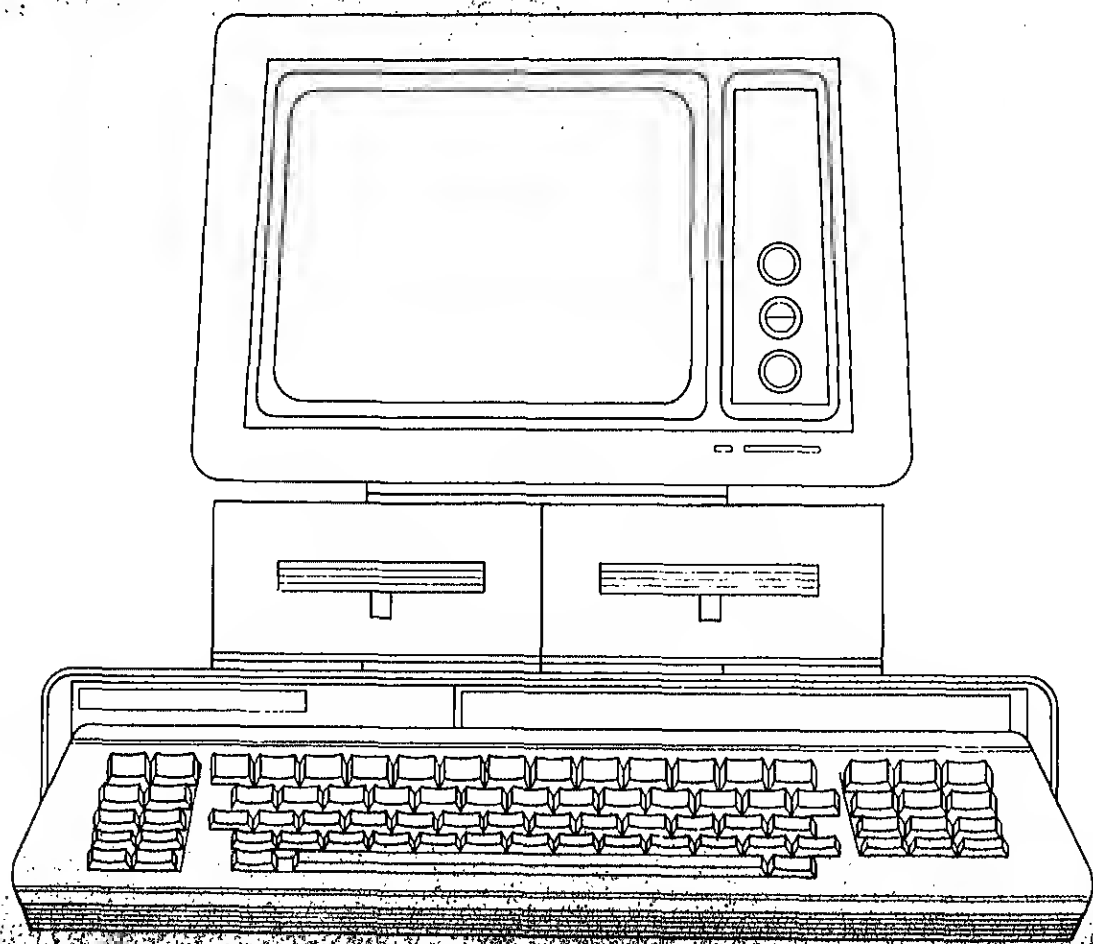
merce. Integrated into the Foreign Disclosure and Technical Information System, the international program and technology office formulates an overall DoD technical position. The office of international economic trade and security policy then provides a policy review and formulates a coordinated DoD position on the export. This entire process typically takes less than thirty days.

These and the other measures described above have led to a new spirit of cooperation, mutual respect, and helpfulness among the United States and its friends and allies, and they have brought dramatic results in the international technology transfer arena. The benefits have accrued to industry as well as to our national security. But they did not come about by chance.

A tough, business-oriented administration team has been forging policies, control mechanisms, and governmental procedures that foster maximum cooperation on technology issues and effective technology controls. We are focusing control efforts on those areas that will give us the most leverage and relaxing controls in areas where they are ineffective. At the same time, we are encouraging international technology sharing when appropriate, and we have brought business on board as a full partner in the process.

With a renewed commitment to international cooperation, Western industrialized nations are collectively and individually taking the necessary measures to impede the Soviet acquisition of high technology. Though the United States and its allies have made real progress during the last four years, the challenges remain formidable. DoD must continue to play its role in establishing, maintaining, and enforcing export control policies that effectively balance the interests of free enterprise and national security. **DMJ**

TALBOT S. LINDSTROM is the deputy under secretary of defense (international programs and technology) in the office of the under secretary of defense for research and engineering. He has also served as special assistant to the under secretary of defense for policy, deputy director of the Commerce Department's office of export administration, and chief of the International Trade Commission's unfair import investigation division. From 1973 until 1980, Mr. Lindstrom was a partner in the law firm of Whitman and Ramsom, specializing in international trade and antitrust and administrative law. He earned baccalaureate and law degrees from Stanford University and a master's degree in international law from the University of California at



the defense stakes are high

By ARTHUR F. VAN COOK

The Department of Defense is working with the Congress, other government agencies, and industry to curb transfer of militarily critical technology to our potential adversaries.

There has been, is now, and continues to be a significant leakage from U.S. shores of valuable technology with military applications. This outflow of technical know-how benefits our adversaries by giving them the means to increase their military potential at the expense of U.S. national security interests. An abundance of evidence supports these charges.

In April 1982, for example, the Central Intelligence Agency issued a report entitled "Soviet Acquisition of Western Technology." It highlighted certain key areas in which the Soviets and East Europeans succeeded in obtaining from the West, by legal and illegal means, a great wealth of data that enhanced their military capability. These acquisitions extended but were not limited to such militarily sensitive areas as computer technology, microelectronics, lasers, electro-optical sensors, and radars (see sidebar on p. 13 for details).

Few can doubt that such gains—often achieved through clandestine methods—are damaging to our national security. That was clearly the case when the Soviets acquired American miniature ball-bearing and microelectronic technologies which enabled them to improve the accuracy of their intercontinental ballistic missiles. And we again sustained damage when they improved their capability to detect and track our submarines by employing electronic tracking devices containing circuitry copied from U.S.-made circuit boards.

This and other evidence supports the view recently expressed by Richard Perle, Assistant Secretary of Defense (International Security Policy). Testifying in April 1984 before the Senate's Permanent Subcommittee on

Investigations, a subset of the Committee on Governmental Affairs, Perle stated that, through the acquisition of Western technology, the Soviets:

- Save billions of dollars and at least five years in their research and development cycle.
- Tremendously reduce the risk of ineffective research and development and the cost of plant modernization.
- Develop countermeasures to our existing and even anticipated defense systems at a much faster rate than would otherwise be the case.

As noted in the CIA report cited earlier, "Stopping the Soviets' extensive acquisition of military-related Western technology in ways that are both effective and appropriate in our open society is one of the most complex and urgent issues facing the Free World today." Obviously, that observation is as valid today as it was then. But the success of any undertaking to stem the flow of high technology to our adversaries depends upon coordination with and cooperation from our friends and allies. This fact, coupled with the need to maintain an appropriate balance between national security and trade promotion considerations, increases the complexity of the issue.

Taken in combination, the foregoing constitutes what is commonly referred to as the technology transfer problem. Over the past decade, the Congress, the scientific and intelligence communities, and others in the executive branch and the private sector have studied every aspect of the problem.* Their conclusions are that:

- The loss of unclassified technical data related to

technologies with significant military application is a serious national security problem.

- In our open society, total control of unclassified technology with military application is neither feasible nor desirable.

- A coherent program to control the loss of such technology is an urgent need.

The time for studying the problem has passed. Congress, the executive branch, and the private sector must now work together toward mutual understanding of the day-to-day problems they face with regard to technology transfer. Government and industry need to arrive at mutually acceptable solutions to these problems and to establish common goals for promoting collective security.

The federal government has the right, if not the responsibility, to ensure that the benefits of technology developed under its sponsorship are retained by the United States for as long as possible. This prerogative implies limits on what may be disclosed to the public and on what may be exported to or accessed by other countries or their representatives. Furthermore, it would be ludicrous for the nation to permit Soviet plunder of U.S. technology to continue unchecked.

Technology transfer admittedly causes greatest concern insofar as it undermines national security, but it has other negative consequences as well. Chief among them is the harm it can inflict on the nation's defense industries. To remain competitive, business concerns must have a market for their products, and one effect of the acquisition of militarily useful technology by our adversaries is the crippling of that market.

Why would any friendly country invest in a sophisticated military system with full knowledge that an adversary can render it ineffective even before it is fielded?

To illustrate, consider the arrest in September 1984 of a West German engineer who allegedly passed to the Soviets critical information concerning European aircraft, including the Tornado fighter plane built by West Germany, Britain, and Italy. Officials fear that the ac-

cused man may have transmitted complete plans for the aircraft, thereby jeopardizing its effectiveness and, by extension, its marketability. (See "Soviets Seen Escalating Drive for West's Industrial Secrets," *Washington Post*, October 24, 1984, p. 25.)

Fortunately, the United States is taking certain initiatives designed to stem the flow of technology with military application to the Soviets and their surrogates. Both the legislative and executive branches are working on the problem. Highlights of their actions to date follow.

The Department of Defense has long sought a legal basis for withholding from public disclosure technical data subject to U.S. export control laws. The Congress, sharing DoD's concern over the protection of that data, enacted such legislation on September 24, 1983, in the form of an amendment to Chapter 4, Title 10, of the United States Code. It authorizes the defense secretary to keep back certain technical data that previously could not be withheld under provisions of the Freedom of Information Act. Specifically, the amendment extends protection to any technical data with military or space application in the possession of, or under control of, the Department of Defense if such data may not be exported lawfully outside the United States without an approval authorization, or license under the export control laws.

As required by the legislation, the department published its proposed implementing regulations in the Federal Register for public comment. Not unexpectedly both the private sector and congressional staffs offered many comments. DoD officials having cognizance over the withholding program carefully evaluated the submissions and incorporated them, to the extent practicable in revised regulations, which the department issued in November 1984.

The new regulations recognize the general concern within industry that government-imposed controls, intended to impede the flow of U.S. high technology to unfriendly nations, could have an adverse effect on the mutual interchange of information essential to technological growth. It also addresses an uneasiness on the part of some that over-extension of export controls will lock U.S. business out of competitive world markets.

Drafters of the DoD implementing regulations have taken care to assure that technical data will not be denied to qualified United States contractors. Furthermore, the regulations do not introduce any additional controls on the dissemination of technical data by private enterprises or individuals beyond those specified by

*See for example, U.S. Congress, Senate Committee on Governmental Affairs, Permanent Subcommittee on Investigations, "Transfer of United States High Technology to the Soviet Union and the Soviet Bloc Nations," report of hearings held on May 4-7 and 12, 1982; National Academy of Sciences, Panel on Scientific Communication and National Security Committee on Science, Engineering, and Public Pol-

COMMODITY	LICENSED FOR EXPORT TO	DIVERTED TO	VALUE
A bubble memory computer factory	France	Bulgaria	\$1.1 million
A sophisticated computer and related peripherals	West Germany, Greece	Soviet Union	\$1 million plus
A number of computer systems	West Germany, United Kingdom	Bulgaria, Czechoslovakia	\$2 million plus
Integrated circuit testers and automated photo-resistance developers	United Kingdom, Spain	Poland, Romania, Bulgaria	\$1 million
Surveillance receivers and other critical technology items	West Germany	East Germany, Soviet Union	\$15 million
Automatic emulsion processor	West Germany	Soviet Union	\$65,000
Industrial carbon dioxide laser	Italy	East Germany, Soviet Union	\$76,000
Mask aligners to manufacture integrated circuits	Switzerland	Soviet Union	\$500,000
Computer and miniature electronic technology	Sweden	East Germany	Unknown
Microwave device and integrated circuits	West Germany, Austria	Soviet Union	\$13 million

houses of Congress smoothly and swiftly, such was not the fate of legislation to amend and extend the Export Administration Act of 1979. This law authorizes the president to prohibit or curtail the export of any goods or technology subject to U.S. jurisdiction or exported by any person subject to U.S. jurisdiction; it expired in September 1983. Since then, pending enactment of new legislation, Congress has extended provisions of the act several times by resolutions. In 1984, the House and Senate each passed a bill for this purpose again, but with significant and sometimes controversial differences.

One major sticking point was a House-passed measure which would have eliminated the need for export licenses on goods and technologies already controlled by the friendly countries who would be receiving them. Many administration officials were concerned that such a provision would make it all but impossible to control the flow of U.S. high technology through and by way of our European allies. In June 1984, following extensive

hearings, a House Armed Services Committee panel on technology transfer also concluded that the removal of licensing requirements for all trade between Western nations—particularly high-technology trade—would pose a serious threat to national security. The panel found that countries in Western Europe often serve as illegal conduits of high-technology equipment, and in its report, the group cited ongoing investigations into illegal diversion of licensed commodities exported to friendly and neutral European nations (see figure).

Other areas of controversy in the Senate- and House-passed versions of the bill included:

- A House-supported provision to limit the circumstances under which the president could impose export controls for foreign policy or national security purposes.
- A Senate-supported provision to establish a process for imposing import controls on national security grounds, one requirement of which was that a majority of COCOM nations not disapprove their imposition (more on COCOM follows).

Department of Defense in the export licensing process.

Over a six-month period, House and Senate conferees struggled to develop a compromise bill that would amend and extend the Export Administration Act of 1979. Though considerable progress was made, they could not agree on certain major issues and, in the closing days of the 98th Congress, a compromise bill passed by the Senate was declared dead. Thus the president continues to manage strategic exports under the International Emergency Economic Powers Act and will do so until such time as the Congress acts in its next session.

Within the executive branch, the president has personally intervened to improve controls over exports through efforts to strengthen COCOM, the Coordinating Committee for Multilateral Security Export Controls. Set up as a voluntary organization in the 1950s, the coordinating committee now numbers Japan and all the NATO countries, except Iceland and Spain, among its members, but it has no formal relationship to NATO or to other international organizations. Nor is COCOM based on any treaty or executive agreement. Its members, therefore, have no legal obligation to participate in COCOM or to abide by commitments made there.

In the past, COCOM has not always met the challenge posed by the extensive efforts of the Soviet Union and the Warsaw Pact to obtain militarily sensitive equipment and technology. Recognizing the need to reinvigorate COCOM, President Reagan, at the Ottawa Summit held in July 1981, appealed to European leaders, Canada, and Japan to join with the United States in tightening controls on high-technology transfers to the Soviet Union and its allies. As a result of this appeal, several high-level COCOM meetings have taken place in the past two years, and they have helped focus the attention of national leaders on the organization for the first time in many years. The participants have made progress structuring COCOM so that it can better carry out its responsibilities, and the Department of Defense has played a major role in this effort.

Mechanisms for authorizing exports of controlled commodities vary widely among COCOM countries. But in testimony before a Senate committee in April 1984, Assistant Secretary of Defense Richard Perle stated that member nations had taken important steps to harmonize these control procedures and to increase direct cooperation and sharing of information among customs and enforcement agencies. He noted that these initiatives, together with ongoing efforts to expand

tion of the NATO allies and Japan, will prevent undesired technology transfer.

Among the executive agencies, the Commerce plays a major role in the technology area. In January 1984, that department issued regulations designed to tighten its export licensing of U.S. exports. A distribution license authorizes exporters to make multiple shipments over an extended period under a single license, thus eliminating the need to obtain an individual license for each shipment. Currently, there are approximately 700 such license holders, including the nation's largest exporters. Overall, the proposed rules would require individual licenses rather than distribution licenses the department processes annually.

The Commerce licensing proposal has encountered objections from firms, trade groups, and foreign governments. Causing most concern were the criteria for eligibility for a distribution license and the requirement that distributors obtain certification of no reexport from customers in countries not in COCOM members, Australia, and New Zealand. Because of the objections, the department revised the proposed rules and in September 1984 issued the final set. Under this new proposal, an applicant for a distribution license would have to demonstrate that it has taken adequate precautionary steps, including the institution and execution of an appropriate control program, and has adequate experience to prevent improper use or diversion.

Commerce altered other provisions of the earlier proposal would have required applicants to have received 50 or more validated licenses in the previous year and to have had, at minimum, a documented relationship with consignees in all major export markets. The revised version calls for "reasonable assurance" that the distribution license will be used for validated licenses and allows exceptions to the relationship if there is other evidence of the exporter's reliability.

The department also reconsidered the requirement for certification against unauthorized reexport. It concluded that it would cause substantial delay and negate much of the advantage of the distribution license. Consequently, the revised rules will require that distributors notify customers in COCOM countries, Australia, and New Zealand if goods are imported from the United States.

Reaping the harvest of Western technology

The following list, drawn from a 1982 report prepared by the Central Intelligence Agency, covers only a portion of what Soviet bloc countries have obtained through their aggressive pursuit of western technical expertise.

Computers: complete systems designs, concepts, hardware, and software, including a wide variety of Western general-purpose computers and minicomputers with military application.

Microelectronics: complete industrial processes as well as semiconductor manufacturing equipment capable of meeting all Soviet military requirements if acquisitions were combined.

Manufacturing: automated and precision manufacturing equipment for electronics, materials, and both optical and laser weapons technology; information on manufacturing technology related to weapons, ammu-

nition, and aircraft parts, including turbine blades, computers, and electronic components.

Lasers: information on optical, pulse power source, and other laser-related components, including special optical mirrors and mirror technology suitable for future laser weapons.

Guidance and navigation: marine and other navigation receivers; advanced inertial guidance components, including miniature and laser gyros, missile guidance subsystems, precision machinery used in producing ball bearings for missiles and other applications, and missile test-range instrumentation systems and documentation; and precision theodolites for collecting data critical to post-flight ballistic missile analysis.

Electro-optical sensors: Information on satellite technology, laser range finders, and underwater low-light-level television cameras and systems for remote operation.

Radar: information on air defense radars and antenna designs for missile systems.

cense barring reexport.

Other stipulations under the new proposal are that applicants for a distribution license have in place:

- Systems for assuring compliance with product and country restrictions.
- An internal audit system or program.
- Nuclear end-use and end-user controls.
- An education program for employees of the firm and for consignee firms involved in distribution license sales.
- A system for distributing the denial list and related material and for verifying that consignees received it.
- Procedures for screening customers against the list.

Generally, the revised version appears to place the primary burden for the distribution license program on companies. It places less emphasis on such requirements as the number of validated transactions needed to qualify for a distribution license and instead depends more on the ability of applicants to demonstrate that all parties to a transaction can be relied on to prevent diversion of goods. The department held a number of hearings in October and November 1984 on both the East and West coasts and expects to have a set of rules in place by early 1985.

In the fiscal year 1985 budget Commerce submitted to Congress, it requested a major increase in department funding—\$9.5 million—only in the trade administration area. The department also requested a major

out a program for analyzing foreign availability of militarily sensitive high-technology products, a measure that would aid the licensing process.

Commerce officials have already taken steps to bolster enforcement activities. In April 1984, William T. Archey, Acting Assistant Secretary of Commerce for Trade Administration, testifying before the Senate's Permanent Subcommittee on Investigations, reported that the department had increased the number of agents from about eight in 1982 to more than 45. He also stated that intelligence analysts numbered about 20—up some sevenfold since 1982—in addition to about 30 other employees in the Office of Export Enforcement. Archey went on to say that, pending congressional approval, Commerce would open six new field offices which, when fully staffed, would bring the total number of export enforcement employees to 99 agents, 24 intelligence analysts, and 49 support personnel.

According to Archey's testimony, the department's enforcement budget doubled between 1981 and 1984, going from \$1.8 million to \$3.6 million. In his estimate, agents were all well-trained and met minimum standards for experience and training required of all federal investigators. What's more, a January 1984 memorandum of understanding between Commerce and the U.S. Customs Service has reportedly brought about improved cooperation between the two agencies, particu-

• Differences over which agencies would have primary responsibility for enforcing the Export Administration Act.

• Differences over increasing the role played by the Department of Defense in the export licensing process.

Over a six-month period, House and Senate conferees struggled to develop a compromise bill that would amend and extend the Export Administration Act of 1979. Though considerable progress was made, they could not agree on certain major issues and, in the closing days of the 98th Congress, a compromise bill passed by the Senate was declared dead. Thus the president continues to manage strategic exports under the International Emergency Economic Powers Act and will do so until such time as the Congress acts in its next session.

Within the executive branch, the president has personally intervened to improve controls over exports through efforts to strengthen COCOM, the Coordinating Committee for Multilateral Security Export Controls. Set up as a voluntary organization in the 1950s, the coordinating committee now numbers Japan and all the NATO countries, except Iceland and Spain, among its members, but it has no formal relationship to NATO or to other international organizations. Nor is COCOM based on any treaty or executive agreement. Its members, therefore, have no legal obligation to participate in COCOM or to abide by commitments made there.

In the past, COCOM has not always met the challenge posed by the extensive efforts of the Soviet Union and the Warsaw Pact to obtain militarily sensitive equipment and technology. Recognizing the need to reinvigorate COCOM, President Reagan, at the Ottawa Summit held in July 1981, appealed to European leaders, Canada, and Japan to join with the United States in tightening controls on high-technology transfers to the Soviet Union and its allies. As a result of this appeal, several high-level COCOM meetings have taken place in the past two years, and they have helped focus the attention of national leaders on the organization for the first time in many years. The participants have made progress structuring COCOM so that it can better carry out its responsibilities, and the Department of Defense has played a major role in this effort.

Mechanisms for authorizing exports of controlled commodities vary widely among COCOM countries. But in testimony before a Senate committee in April 1984, Assistant Secretary of Defense Richard Perle stated that member nations had taken important steps to

COCOM quarters, increase staff, and modernize facilities, have set the organization on a new course not thought possible a few years earlier. COCOM is, of course, vital to U.S. interests, for without the cooperation of the NATO allies and Japan, we cannot hope to prevent undesired technology transfer from occurring.

Among the executive agencies, the Department of Commerce plays a major role in the technology transfer area. In January 1984, that department proposed new regulations designed to tighten its program for distribution licensing of U.S. exports. A distribution license authorizes exporters to make multiple shipments over an extended period under a single license, thereby eliminating the need to obtain an individual validated license for each shipment. Currently, there are approximately 700 such license holders, including many of the nation's largest exporters. Overall, the program absorbs an estimated one million transactions which otherwise would require individual licenses rather than the 90,000 licenses the department processes annually.

The Commerce licensing proposal sparked a host of objections from firms, trade groups, and even foreign governments. Causing most concern were the new criteria for eligibility for a distribution license and the requirement that distributors obtain certification against reexport from customers in countries other than COCOM members, Australia, and New Zealand. Because of the objections, the department reexamined the proposed rules and in September 1984 offered a revised set. Under this new proposal, an applicant for a distribution license would have to demonstrate that he has taken adequate precautionary steps, including the institution and execution of an appropriate internal control program, and has adequate experience to assure against improper use or diversion.

Commerce altered other provisions as well. The earlier proposal would have required applicants to have received 50 or more validated licenses in the previous year and to have had, at minimum, a one-year documented relationship with consignees aside from subsidiaries. The revised version calls for "reasonable expectation" that the distribution license will replace 25 validated licenses and allows exceptions to the one-year relationship if there is other evidence of consignee reliability.

The department also reconsidered the requirement for certification against unauthorized reexport and concluded that it would cause substantial delays that could negate much of the advantage of the distribution li-

The following list, drawn from a 1982 report prepared by the Central Intelligence Agency, covers only a portion of what Soviet bloc countries have obtained through their aggressive pursuit of western technical expertise.

Computers: complete systems designs, concepts, hardware, and software, including a wide variety of Western general-purpose computers and minicomputers with military application.

Microelectronics: complete industrial processes as well as semiconductor manufacturing equipment capable of meeting all Soviet military requirements if acquisitions were combined.

Manufacturing: automated and precision manufacturing equipment for electronics, materials, and both optical and laser weapons technology; information on manufacturing technology related to weapons, ammu-

and other laser-related components, including special optical mirrors and mirror technology suitable for future laser weapons.

Guidance and navigation: marine and other navigation receivers; advanced inertial guidance components, including miniature and laser gyros, missile guidance subsystems, precision machinery used in producing ball bearings for missiles and other applications, and missile test-range instrumentation systems and documentation; and precision theodolites for collecting data critical to post-flight ballistic missile analysis.

Electro-optical sensors: information on satellite technology, laser range finders, and underwater low-light-level television cameras and systems for remote operation.

Radar: information on air defense radars and antenna designs for missile systems.

cense barring reexport.

Other stipulations under the new proposal are that applicants for a distribution license have in place:

- Systems for assuring compliance with product and country restrictions.
- An internal audit system or program.
- Nuclear end-use and end-user controls.
- An education program for employees of the firm and for consignee firms involved in distribution license sales.
- A system for distributing the denial list and related material and for verifying that consignees received it.
- Procedures for screening customers against the list.

Generally, the revised version appears to place the primary burden for the distribution license program on companies. It places less emphasis on such requirements as the number of validated transactions needed to qualify for a distribution license and instead depends more on the ability of applicants to demonstrate that all parties to a transaction can be relied on to prevent diversion of goods. The department held a number of hearings in October and November 1984 on both the East and West coasts and expects to have a set of rules in place by early 1985.

In the fiscal year 1985 budget Commerce submitted to Congress, it requested a major increase in department funding—\$9.5 million—only in the trade administration area. The department would use the additional money to continue upgrading enforcement activities, to monitor distribution licenses more closely, and to carry

out a program for analyzing foreign availability of militarily sensitive high-technology products, a measure that would aid the licensing process.

Commerce officials have already taken steps to bolster enforcement activities. In April 1984, William T. Archey, Acting Assistant Secretary of Commerce for Trade Administration, testifying before the Senate's Permanent Subcommittee on Investigations, reported that the department had increased the number of agents from about eight in 1982 to more than 45. He also stated that intelligence analysts numbered about 20—up some sevenfold since 1982—in addition to about 30 other employees in the Office of Export Enforcement. Archey went on to say that, pending congressional approval, Commerce would open six new field offices which, when fully staffed, would bring the total number of export enforcement employees to 99 agents, 24 intelligence analysts, and 49 support personnel.

According to Archey's testimony, the department's enforcement budget doubled between 1981 and 1984, going from \$1.8 million to \$3.6 million. In his estimate, agents were all well-trained and met minimum standards for experience and training required of all federal investigators. What's more, a January 1984 memorandum of understanding between Commerce and the U.S. Customs Service has reportedly brought about improved cooperation between the two agencies, particularly in overseas investigations.

Like the Commerce Department, the Defense Department has a very large stake in protecting high technol-

port was developed under DoD contract on the control of unclassified technology with military application (cited above), and it contained major recommendations designed to provide a coherent system of control, identify what technical data should be protected, establish mechanisms of control, and put appropriate compliance measures in place.

In October 1983, the under secretaries of defense for policy and for research and engineering undertook a joint initiative in response to these recommendations. Their purpose was to:

- Establish a process for identifying technologies that most urgently require uniform and consistent control—including the point of emergence at which controls should be initiated—throughout the department and defense industry.

- Develop the necessary policy, procedural, and technical guidance for the control of those technologies.

- Promulgate such guidance within the department and among defense contractors.

Work is already under way to achieve these objectives. In mid-January 1984, DoD published a new directive, DoDD 2040.2, entitled "International Transfers of Technology, Goods, Services, and Munitions." It implements relevant portions of the Export Administration Act, the Arms Export Control Act, and a National Security Decision Directive on U.S. conventional arms transfer policy. The directive establishes policy, assigns responsibility, and prescribes procedures for international transfer of defense-related technology, services, and materiel.

The office of the under secretary of defense for policy now has responsibility for developing, coordinating, and issuing policies relating to control of technology transfer. Other duties assigned to that office include preparing policy guidance on control and enforcement of technology transfer and coordinating the overall application of DoD policy. The directive charges the office of the under secretary of defense for research and engineering with managing DoD technical and acquisition efforts related to technology, goods, services, and munitions transfer. This office is also to oversee implementation of DoD technology transfer policy for all research, development, and acquisition matters.

In setting forth policy, this latest DoD issuance prescribes that Defense Department components shall:

- Control the export of technology, goods, services, and munitions that contribute to the military potential of any country or combination of countries when that po-

country or international organization support specific national security or foreign policy objectives.

- Facilitate sharing of military technology only with allies and other nations that cooperate in safeguarding technology, goods, services, and munitions from transfer to nations whose interests are inimical to those of the United States.

- Give special attention to rapidly emerging, changing technology to protect against conveying that militarily useful technology to potential adversaries before adequate safeguards can be implemented.

- Through improved international cooperation, seek to strengthen foreign procedures for protecting sensitive and defense-related technology.

The newly established procedures also call for a case-by-case review, technical evaluation, operational and military mission impact assessments, and intelligence assessments on all proposed transfers. In addition, they caution that transfers must be consistent with U.S. national security and foreign policy objectives and must not constitute unreasonable risk to U.S. security in the degree to which they reduce technological lead time. Sensitive transfers are to be made conditional upon agreements with allies and other nations to protect against retransfer. Transfers through multinational organizations in which potential adversaries participate are to be opposed.

Clearly, the intent of these policies is to ensure closer scrutiny of proposed transfers. Delays in arriving at a decision in each case may pose difficulties, however. Case processors often do not have the necessary guidance readily available to determine, for example, whether a proposed transfer is consistent with U.S. national security and foreign policy objectives or whether it would reduce technological lead time and thereby constitute an unreasonable risk. He or she needs to seek out this guidance from various quarters in the department.

Without the full cooperation of both government and industry, the implementation of any system of control is likely to be ineffectual. The department has therefore undertaken initiatives in the areas of outreach and education as well. Specifically, it has let a contract to develop educational packages on technology transfer matters for presentation to key government and industry personnel. The purpose of these comprehensive training packages is to:

- Provide key government and contractor personnel

of exports settled

In early January 1985, White House national security affairs adviser Robert C. McFarlane sent a presidential directive to the secretaries of defense, state, and commerce which authorizes a systematic review by DoD of high-technology exports to 15 noncommunist countries.

The new directive permits the Pentagon to review all applications for licenses to export certain kinds of commercial equipment—computer parts, scientific instruments, and the like—that DoD feared was being diverted illegally to the Soviet Union.

For the first time, DoD will have access to the Commerce Department computer to review information col-

llection to determine if an export is being diverted to the Soviet Union.

If Commerce objects to DoD's objection, the matter is forwarded for resolution to a committee headed by Donald R. Fortier, deputy national security affairs adviser. Other committee members are Richard N. Perle, assistant secretary of defense for international security policy; the assistant secretary of commerce for trade administration (currently a vacant position), and a nonvoting State Department official.

The directive also authorizes DoD to review distribution licenses, which allow exportation of an entire category of goods to certain countries. The Pentagon can reconstitute the list of 15 countries as circumstances change.

(Washington Post, January 12, 1985)

with a clear appreciation of the damage to our national security that can result from leakage of unclassified technical data with military application.

- Educate government and industry personnel about DoD policies, practices, and procedures currently in effect to counter the threat.

- Foster widespread awareness of evolving DoD policies designed to better protect unclassified technical data with military or space application against public disclosure and foreign access.

- Aid in developing methods for implementing policy at minimum cost and with minimum impact on scientific innovation and the ability of defense industries to compete successfully in domestic and international markets.

- Serve as a forum for enhancing ongoing dialogue between DoD and industry, an exchange that is necessary if we are to have a consistent and effective technology transfer program.

As these and other initiatives outlined above indicate, the government has done much to establish the foundations for a cohesive technology transfer program. The Congress has enacted and is working on legislation that provides a basis in law. The executive branch has put in place policies designed to implement that law. It has also delineated and assigned responsibilities for carrying out an effective control program, and plans are under way for a comprehensive outreach and education program.

With legislation and high-level policies in place, the government is now in the process of interpreting and translating them into specific requirements. Thus the time is opportune for industry to pursue its dialogue

reasonable and that their imposition will not prove an impediment to U.S. competitiveness, will not effectively close export markets to foreign competition, and will not stifle interchange of information. If government and industry work together, the resulting requirements can meet these criteria and at the same time satisfy the critical need for a cohesive and consistent system of controls. Without such a system, we will not be able to deny to the Soviets and Eastern bloc nations the technical know-how they must have to cut production costs, shorten procurement lead times, and improve the quality of military weapons that one day may be used against us. **DMJ**

ARTHUR F. VAN COOK is president of Avanco International, Inc., a consulting firm located in Vienna, Virginia. From 1973 until his retirement from federal service in 1982, Mr. Van Cook served as Director of Information Security in the Department of Defense. He also chaired the U.S. Interagency National Military Information Disclosure Policy Committee from 1978 until 1982 and was the designated U.S. representative to the NATO Security Committee during that same period. Drawing upon his extensive experience in matters pertaining to export control, technology transfer, and foreign disclosure, Mr. Van Cook has testified as an expert witness before various congressional committees. His awards include the Department of Defense Distinguished Service Medal, the Secretary of Defense Meritorious Service Medal, and the Army's Outstanding Civilian Service Medal. He attended the University of Maryland.

Lifting limits on end strength: results of a DoD experiment

By LARRY W. LACY

DoD's industrially funded activities were temporarily exempt from civilian end-strength restrictions in FY 1983. That trial period was so successful that Congress has extended it.

Until Congress provided a temporary exemption in fiscal year 1983, industrial fund activities, like all other parts of DoD, operated under limits on the number of civilians who could be employed on the last day of the fiscal year. The imposition of end-strength ceilings reflects a widely held belief that federal payrolls tend to expand over time regardless of the number of people actually required for government functions, including defense. Stated differently, the argument is that ceilings encourage efficiency by making one resource, manpower, scarce. Opponents of ceilings counter that the limits are unnecessary in the case of industrially funded activities, which must be efficient if they are to avoid operating deficits.

Historically, industrial fund manpower allocations have often been substantially below levels necessary to complete funded workloads, resulting in the kinds of major problems described below. But when Congress exempted industrial fund activities from civilian ceilings in FY 83, it alleviated many of these problems. This experiment yielded millions of dollars in savings and important benefits in areas such as workload scheduling, training, and recruiting.

Use of temporary employees. Prior to the experiment, industrial fund managers used temporary employ-

ees as the chief means of completing workloads while at the same time meeting end-of-year ceilings. Managers typically released temporary workers some time near the end of the fiscal year to avoid including them in the September 30 counts. After complying with the one-day ceiling, the activity rehired or replaced these people in October. This annual process led to several inefficiencies.

For various reasons, activities could not rehire some temporary employees, perhaps as many as 30 percent, and therefore had to recruit and train new workers. Even those temporaries reemployed had to spend work time being dropped from and added back to the rolls if their absence lasted more than a few days. This practice often lowered morale and, hence, productivity among temporary workers.

In addition, processing employee terminations and subsequent rehires consumed the time of permanent staff. The Navy, which accounted for 70 percent of temporary employee separations at the end of FY 1982, estimated its releasing and rehiring costs at about \$500 per separation. This figure covered time lost by managers in planning terminations and counseling employees and by workers in transferring out of and back into their jobs. Also included were personnel costs associated with processing separations and additions as well as the expense of training new employees.

Lack of flexibility in meeting workload fluctuations. Industrial fund activities frequently have to meet unanticipated demands for their services, and personnel ceilings detract from their ability to do so. Changes in

Mechanics at the San Antonio Air Logistics Center assemble an overhauled F-100 engine; the center was one of a number of industrial fund activities to show gains in productivity as a result of an FY 83 experiment that temporarily lifted civilian personnel end-strength ceilings at such facilities.

By LARRY W. LACY

DoD's industrially funded activities were temporarily exempt from civilian end-strength restrictions in FY 1983. That trial period was so successful that Congress has extended it.

Until Congress provided a temporary exemption in fiscal year 1983, industrial fund activities, like all other parts of DoD, operated under limits on the number of civilians who could be employed on the last day of the fiscal year. The imposition of end-strength ceilings reflects a widely held belief that federal payrolls tend to expand over time regardless of the number of people actually required for government functions, including defense. Stated differently, the argument is that ceilings encourage efficiency by making one resource, manpower, scarce. Opponents of ceilings counter that the limits are unnecessary in the case of industrially funded activities, which must be efficient if they are to avoid operating deficits.

Historically, industrial fund manpower allocations have often been substantially below levels necessary to complete funded workloads, resulting in the kinds of major problems described below. But when Congress exempted industrial fund activities from civilian ceilings in FY 83, it alleviated many of these problems. This experiment yielded millions of dollars in savings and important benefits in areas such as workload scheduling, training, and recruiting.

Use of temporary employees. Prior to the experiment, industrial fund managers used temporary employ-

ees as the chief means of completing workloads while at the same time meeting end-of-year ceilings. Managers typically released temporary workers some time near the end of the fiscal year to avoid including them in the September 30 counts. After complying with the one-day ceiling, the activity rehired or replaced these people in October. This annual process led to several inefficiencies.

For various reasons, activities could not rehire some temporary employees, perhaps as many as 30 percent, and therefore had to recruit and train new workers. Even those temporaries reemployed had to spend work time being dropped from and added back to the rolls if their absence lasted more than a few days. This practice often lowered morale and, hence, productivity among temporary workers.

In addition, processing employee terminations and subsequent rehires consumed the time of permanent staff. The Navy, which accounted for 70 percent of temporary employee separations at the end of FY 1982, estimated its releasing and rehiring costs at about \$500 per separation. This figure covered time lost by managers in planning terminations and counseling employees and by workers in transferring out of and back into their jobs. Also included were personnel costs associated with processing separations and additions as well as the expense of training new employees.

Lack of flexibility in meeting workload fluctuations. Industrial fund activities frequently have to meet unanticipated demands for their services, and personnel ceilings detract from their ability to do so. Changes in

Mechanics at the San Antonio Air Logistics Center assemble an overhauled F-100 engine; the center was one of a number of industrial fund activities to show gains in productivity as a result of an FY 83 experiment that temporarily lifted civilian personnel end-strength ceilings at such facilities.

such as ship moves, battle damage, higher maintenance equipment failure rates, and other factors all require sharp acceleration of industrial fund operations. While activities can normally accommodate such jumps in workload by hiring temporary workers or increasing overtime, in some instances they are already operating near capacity because of employment limits.

In 1981-82, for example, Puget Sound and Norfolk Naval shipyards were faced with workload surges but had to delay overhauls on several ships by up to 10 months, largely because of ceiling constraints. Both activities also refused other ship maintenance, and one installation reassigned a ship overhaul to a private shipyard. In addition, Puget Sound had to borrow about 200 personnel from other installations in order to meet new demands early in FY 1983; a ceiling at the end of FY 1982 had prevented the shipyard from expanding its work force in anticipation of the additional work.

Excessive overtime. To compensate for loss of temporaries released to meet ceilings, industrial fund activities must sometimes use unusual amounts of overtime near the end of one fiscal year and at the beginning of the next. On occasion, difficulties in recruiting and training skilled workers under such circumstances has led to excessive overtime in certain occupations. Although moderate levels of overtime may reduce unit costs through more efficient use of plant and equipment, prolonged periods of working well beyond normal hours lead to employee fatigue and eventually to lower output. Excessive overtime also eliminates any reserve capacity for unexpected surges, a very dangerous situation for defense depots.

Actually, aggregate overtime rates in industrially funded activities were not excessive under ceiling controls. The overall FY 1982 rate, for example, was 6.7 percent, well within what private industry usually considers optimal. Acceptable aggregate rates, however, can mask the serious difficulties that extraordinary use of overtime sometimes causes.

During fiscal year 1981, for example, employment constraints left the San Antonio Air Logistics Center with few options for responding to an unanticipated surge in engine overhaul requirements. To meet the unexpectedly high demand, engine division employees had to work 20 to 30 percent overtime for four months. Output fell behind schedule, and the air logistics center turned over a large amount of work to a private contractor at a significant increase in costs. At the same depot in the following year, overtime rates in the aircraft division rose to levels of 23 to 35 percent for more than five

private sources can be more expensive than in-house labor, particularly when there is only one commercial producer of the needed services. Although ceilings do allow managers to seek authorization for additional people when cost analysis indicates that shifting work in-house is cheaper, the long time needed to win approval through the budget process has discouraged such transfers. In recognition of the problem, the House Appropriations Committee report on the FY 1984 Defense Appropriation Bill called for faster transfer of maintenance from the private sector to DoD depots when savings can be realized.

Training-related difficulties. Employee training, an investment in human capital that can pay large future dividends, also suffers when end-strength constraints are in place. Because industrial fund managers at times have only limited resources for meeting current workload requirements, they are not able to take scarce workers away from their jobs to prepare them for future tasks. Unable to produce their own skilled employees, installations have had to look for them in local labor markets, where they may be more expensive or even unavailable. In addition, activities have carried apprentices and other trainees for many weeks, only to have to drop them at the end of the year to meet ceilings. They have had to defer apprentice classes until the beginning of the next fiscal year as well.

Recruiting impediments. In some instances, ceilings have forced industrially funded installations into annual hiring schedules that handicap them in competing for the most promising new entrants to the labor force. Most college seniors and almost all high school seniors graduate in May or June, just when installations typically have to restrict hiring to avoid violating September 30 employment limits. Activities can recruit these spring graduates but usually may not bring them on board until October 1. As a result, the government has lost many of its most able prospects to nonfederal jobs.

Ceilings hinder DoD in hiring experienced labor too. When a skilled, seasoned worker becomes available, installations often can offer that person only a temporary job, with the possibility of a permanent slot later. Accepting such an offer entails all the disadvantages of nonpermanent federal employment—little job security, no retirement provisions except social security, and no health and life insurance benefits. Some experienced workers with other options have declined such unattractive conditions.

Indirect functions deferred. As noted above, indus-

Industrially funded activities

Given the vast scale of defense operations, specialization of DoD activities by function is, inevitably, a fact of life. As a result, many components within the Defense Department have no combat role per se but provide support services that are at least potentially available from private, for-profit suppliers. For example, both federal and private-sector shipyards can overhaul destroyers. To encourage efficiency among government activities that carry out such functions, Congress authorized creation of the Industrial fund, under which depots and similar Defense Department activities charge for the services they render.

The industrial fund process works as follows. Typically, a DoD organization financed by appropriated funds places an order with a depot for the servicing of equipment or weapons. Whether the item is a small field radio or an aircraft carrier, the depot contracts to supply the services requested at given prices and according to negotiated schedules. Prices charged are to cover all direct expenses as well as overhead. Depot managers must recoup all costs of operation out of payments for serviced weapons or equipment; poor management of resources will lead to deficits and eventually to the higher prices necessary to cover these losses. Industrial fund managers are expected to operate within their budgets except when events beyond their control intervene.

The military services and DoD agencies are free to choose, with the approval of the office of the secretary of defense, which activities will be industrially funded. As is clear from the accompanying figure, each service, as well as the Defense Logistics Agency and the Defense Communications Agency, has extended industrial funding beyond depots in order to promote efficiency.

DoD organizations using industrial funding in FY-83	
DoD COMPONENT	TYPE OF ACTIVITY
Army	Weapons depots Equipment depots Armament activities Missile activities Laboratories Proving grounds Transportation
Navy	Shipyards Aircraft depots Ordnance activities Missile activities Laboratories Transportation Base services Printing
Air Force	Aircraft depots Transportation Laundry Base services
Marine Corps	Weapons depots Equipment depots
Defense Logistics Agency	Clothing manufacture
Defense Communications Agency	Communications

Industrial fund managers under pressure to fulfill immediate requirements sometimes postpone investments that yield benefits later. Indirect functions in particular are likely candidates, as managers delay hiring personnel to engineer new procedures for producing replacement parts or to monitor contractor performance. If the benefits from such efforts are deferred, or even lost, DoD fails to achieve savings and quality improvements.

Recognition of these various problems influenced Congress to remove all ceilings from Defense Department industrial fund activities in FY 1983. This action marked a major departure from previous management

First, the Defense Appropriation Act for that year, which contained the ceiling exemption in Section 788, did not become law until December 1982. By that time—almost three months into the fiscal year—managers had already developed manpower plans that would comply with anticipated FY 1983 ceilings. Thus, only about nine months remained to revise those plans and begin operating under a new set of rules.

Second, the possibility that Congress might reimpose ceilings in FY 1984—Section 788 was mute on the future—constrained the options of industrial fund managers. In the interests of prudence, many were reluctant

to only about temporary employment, which was much as in previous years. (Congress, after the end of FY 1983, did extend the ceiling exemption for another year.)

Third, total funded workloads, in constant dollars, changed relatively little between fiscal years 1982 and 1983. As a result, total industrial fund work years grew by only about one percent. That fairly constant demand provided only a few opportunities to show how Section 788 could help managers adjust their work forces to handle changes in workload, whether up or down.

In spite of these limitations, the services reported a broad range of benefits from lifting ceilings. The following discussion highlights types of major gains realized and includes specific examples of each. Also important, however, is what did not happen during the ceiling experiment.

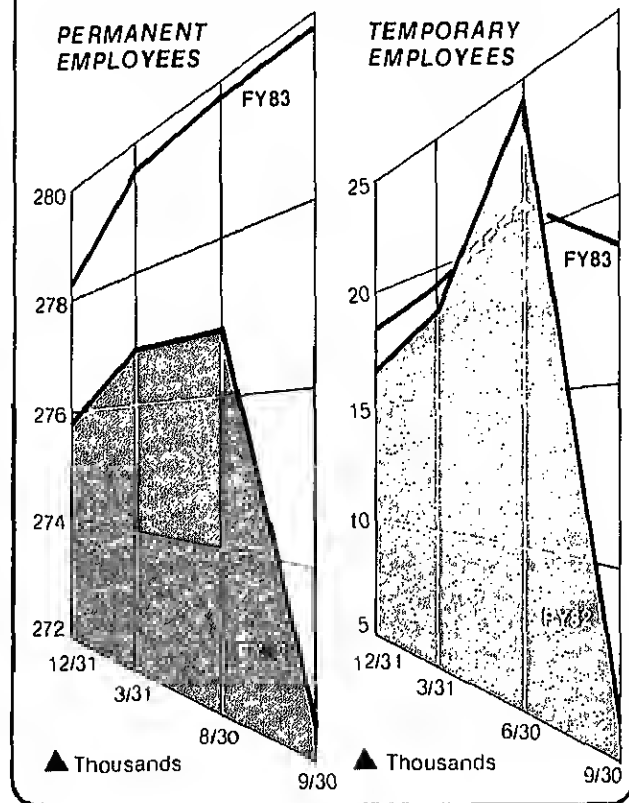
Employment totals. A comparison of employment totals for fiscal years 1982 and 1983 demonstrates that civilian personnel ceilings are not necessary to prevent unwarranted work force growth. Constrained by fairly constant overall workload—rather than by year-end limits on personnel—industrial fund managers as a group kept FY 1983 employment at about the level of the preceding year. As Figure 1 shows, the chief difference was the absence of a sharp fourth-quarter dip in 1983 personnel totals.

The comparatively small rise in permanent staff from one year to the next primarily reflects two factors. First, before the ceiling experiment began, the Navy had planned to add about 5,000 workers to its shipyards to accommodate projected workloads, and it carried out those plans. (Expected declines in Air Force depot personnel largely offset anticipated growth at Army depots.) Second, because Congress removed the ceilings, industrial fund managers were able to fill permanent slots that became vacant during the fourth quarter of FY 1983; they did not have to wait until the first quarter of the following fiscal year.

A major difference between FY 1983 and the preceding year was the relatively steady temporary staff totals throughout 1983. If ceilings had been in effect for industrial fund activities during that year, those totals would have been about 284,000 (the FY 1982 level plus additional workers due to growth in workload at the shipyards and elsewhere). In other words, installations would have had to release perhaps 14,000 or more nonpermanent workers by September 30, 1983.

As a result of the stable employment pattern under the experiment, application of straight-time labor (all work hours less overtime) during the last three months of the

Figure 1. Industrial fund employment, FY 82 and FY 83

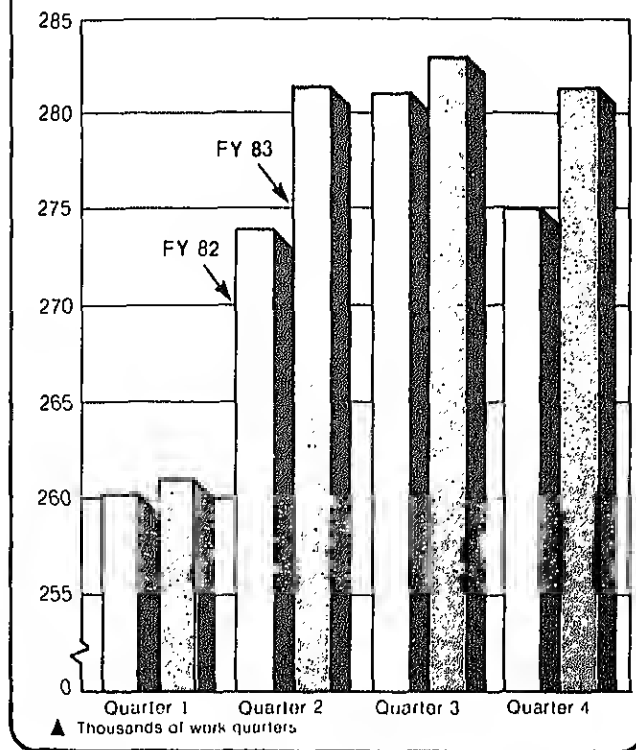


force totals in the first quarter reflects the separation of large numbers of temporary workers at the end of the preceding fiscal years. Release of nonpermanent employees was necessary to comply with ceilings then in effect.

The absence of ceilings did not cause indirect functions to grow faster than time devoted directly to production, as some feared it might. Although the exemption did allow modest expansion in indirect functions, overall these efforts accounted for the same share of total workyears (41 percent) in FY 1983 as they did in FY 1982.

Improved personnel practices. Because industrial fund activities did not have to discharge some 14,000 temporary employees at the end of FY 1983, the Defense Department realized significant savings. At an estimated cost of \$500 per separation, those personnel actions would have required outlays of approximately \$7 million. Nonquantifiable benefits included better employee morale and a more positive image for DoD as an

**Figure 2. Applications of straight-time labor
in industrial fund activities**



use the most cost-effective combination of temporaries, permanent employees, and overtime to complete workloads. The 1983 experiment demonstrated the advantages time and time again:

- The Oklahoma City Air Logistics Center was able to fill unprogrammed, high-priority orders without having to postpone scheduled work. The availability of additional civilian workers allowed the aircraft maintenance depot to send its military personnel to England, where they assisted with TF30 engine problems. The depot also was able to give on-site support to Air Force operations in the Pacific when local shops were overloaded and to complete unprogrammed maintenance of TF41 second-stage turbines. The depot employed about 700 more workers on September 30, 1983, than it did 12 months earlier, with the growth almost equally divided between permanent and temporary staff.

- The Army's Munitions and Chemical Command was able to increase markedly its responsiveness to customer orders. In one instance, the command acceler-

ated significantly behind schedule in FY 1983. By the end of June, the station, which arms and tests the torpedoes before shipping them to the fleet, had forwarded only 47 of 112 torpedoes needed. But the flexibility provided under the experiment allowed the station to handle an influx of late deliveries from the contractor so that it not only met but exceeded its delivery date.

- When the Military Sealift Command failed to receive replacement vessels on schedule, it continued operating two ships manned by civilians and originally scheduled for deactivation in 1983. The ceiling exemption enabled the Navy to man both the older ships and their replacements while the latter were becoming fully operational.

- Navy activities also smoothed workload phasing during FY 1982 and reached a more efficient skill mix by adjusting work force levels on the basis of workload rather than civilian ceilings. Since the beginning of FY 1982, for example, the Puget Sound Naval Shipyard had completed work on only three of 11 ships on schedule, and man-day expenditures had exceeded estimates on nine of the 11 ships. In FY 1983, however, the shipyard finished five of six ships early, and man-day expenditures for all six were below estimates, largely due to the flexibility provided by lifting ceilings.

Expanded training opportunities. Without ceiling constraints, moreover, industrial fund managers could offer the timely training workers need to improve performance or acquire new skills. Experience during the 1983 experiment illustrates the payback that such training can provide.

- Before the ceilings were lifted, the Air Force's Oklahoma City maintenance depot had planned to take on the repair of J-79 engines then under way at the San Antonio depot. Preparation was to begin in October 1983, after the facility had met its ceiling for the preceding fiscal year. But the experiment enabled Oklahoma City to begin training employees for the job in the fourth quarter of FY 1983, three months ahead of schedule; actual repairs then began in October instead of January, as originally planned. The San Antonio depot, in turn, used the newly available capacity resulting from early transfer of the J-79 to accelerate repair of F-100 engines for the F-15 and F-16 aircraft.

- With ceilings in place, the Red River Army Depot had often been unable to train all the apprentices it needed to replace older workers who were retiring. In 1983, the depot was able to double its apprentice program from 20 to 40 trainees.

permitted the arsenal to cancel two classes of apprentices at an estimated cost avoidance of \$2.5 million over three years, the length of the apprentice program.

- Similarly, the Army's Watervliet Arsenal hired more than 100 journeyman machinists and thereby saved an estimated \$1.7 million in training costs.

- The Air Logistics Center at Warner Robins Air Force Base hired 150 experienced aircraft mechanics, electricians, and sheet metal workers and was thus able to complete additional work on the C-130 and F-15 aircraft.

- The Naval Material Command's research and development centers added more than 900 top-quality recent science and engineering graduates to their ranks. In past years, superior candidates had often already started other jobs before the industrial fund activities could hire them in October. Long-term benefits in the quality of the Navy's research and development program should be substantial.

Indirect function paybacks. Additionally, managers took advantage of the ceiling experiment to focus effort on indirect functions that can cut costs and improve the quality of services delivered. By investing resources wisely in work not directly tied to production (but sometimes deferred in the past), management realized handsome returns. The Naval Avionics Center in Indianapolis, Indiana, was a case in point:

- Without ceiling constraints, the center was able to hire contract specialists to review transfer of 22 projects from sole-source to competitive-procurement status. The first three conversions showed potential long-term savings of \$358 million, and further conversions likewise promise significant cost reductions.

- By more closely monitoring fabrication of equipment and spare parts for the fleet, the center was able to resolve problems in contractor workmanship.

- It also assigned more people to its failure analysis laboratory, a step that helped the center correct problems in equipment and weapon production, thus saving money on repairs later and improving product reliability.

- The installation added permanent engineers and technicians to study microcircuit obsolescence, work considered essential to maintaining the Navy's complex electronic weapon systems.

Experience at another activity, the Naval Air Engineering Center at Lakehurst, New Jersey, was similar.

million over the next two years.

Shifting work in-house. Total employment grew little at industrial fund activities in FY 1983. Consequently, installations did not transfer much work in-house, even when analysis indicated they could do the work at lower cost than private contractors; managers were understandably reluctant to take on new workload without assurance that they could keep the staff necessary to do the job. In addition, shifting to organic performance requires significant lead time for cost analysis, terminating existing contracts, and hiring new people.

Nevertheless, experience at two facilities during the experiment does illustrate the savings possible by using the most cost-effective mix of in-house and contracted services. Cost analysis at the Sacramento Army Depot indicated that its employees could develop test program sets at less than half the cost of private firms. The depot did not have to seek an increase in its ceiling and therefore hired 123 additional people to do the work. The Naval Air Engineering Center located in Lakehurst, New Jersey, used its hiring authority to fill 133 new positions and thus saved \$3.1 million by performing new or expanded tests internally.

These and other findings deriving from the FY 1983 experiment are encouraging. They demonstrate that DoD's industrial fund managers will responsibly relate the numbers of workers employed to the size of the job to be done. Furthermore, lifting ceilings led to the numerous management improvements described above. On the strength of these gains, Congress authorized removal of civilian ceilings from *all* DoD activities for FY 1985, not just from those that are industrially funded. **OMJ**

LARRY W. LACY is a senior labor economist in the office of the assistant secretary of defense (manpower, installations and logistics), where he works for the deputy assistant secretary for civilian personnel policy and requirements. Before joining DoD in 1982, he held similar positions at the National Science Foundation and the National Institutes of Health. Dr. Lacy earned a bachelor's degree in government from the University of Texas, a master's in international relations from Yale University, and a doctorate in economics from George Washington University.

Though not a cure-all for acquisition ills, multiyear procurement can yield healthy savings when properly prescribed.

At the time the Reagan administration took office, the Congress and many in the defense community had reached a consensus that the weapon systems acquisition process—getting weapons from the drawing board into the hands of users in the field—was inefficient and ripe for overhaul. The acquisition cycle was too long, too costly, too complex, and too unreliable. Because the administration was committed to increased defense spending, officials needed to convince both Congress and the taxpayers that greater defense outlays would not be wasted. Meaningful acquisition reform was therefore crucial.

One of the most heralded reform initiatives that followed was the call for more widespread use of multiyear procurement. Though not a panacea for all acquisition ills, multiyear procurement is a key component in any serious effort to improve the acquisition process. It offers excellent opportunities for effecting significant savings and strengthening the defense industrial base. But realizing those benefits, as the discussion below makes clear, depends upon applying the approach properly.

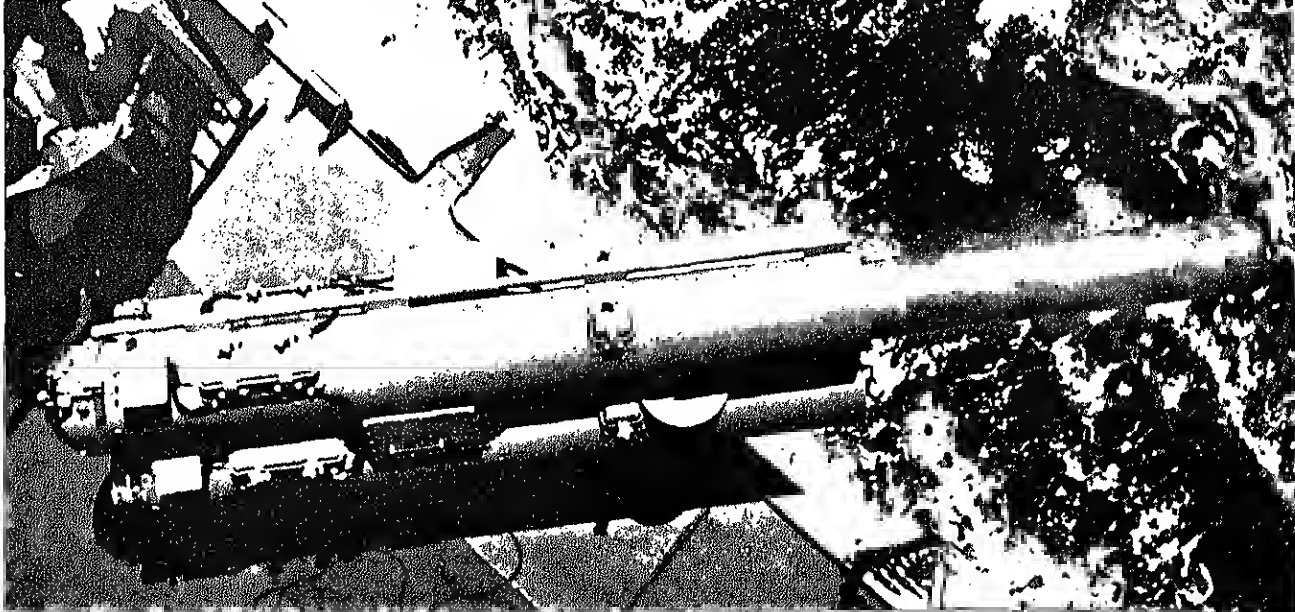
Multiyear procurement often offers an attractive alternative to annual contracting, the usual way in which the Defense Department conducts its acquisition business. Though not without its virtues, the practice of satisfying procurement requirements by letting a series of annual contracts has tended to exacerbate program instability, a long-standing problem for DoD contractors. That instability, in turn, has contributed greatly to the deteriorating condition of the defense industrial base in the United States.

Under current procedures, DoD normally cannot sign

a contract and obligate money for programs unless Congress first passes two separate pieces of legislation—one authorizing the program and one appropriating the necessary funds for it. The legislative process eventually results in an annual Defense Appropriation Act, which funds equipment purchases programmed each year in the Five Year Defense Plan. Funding is on a program-by-program basis and is usually limited to that amount necessary to satisfy procurement requirements for one fiscal year. The department makes purchases by means of annual contracts providing for production and delivery of one year's requirements.

DoD Directive 7200.4, "Full Funding of DoD Procurement Programs," mandates this annual approach, which ensures that both Congress and the public are aware of the estimated total cost of an item when it is first presented for an appropriation. The annual appropriations process also has other advantages. In addition to giving continual visibility to high-cost items, it provides opportunities each year for making changes to design, production rate, and quantity in order to meet the changing threat, apply new technology, or respond to budgetary pressures. Moreover, the process does not force one Congress to honor financial obligations incurred by a previous one.

However, annual contracting has some distinct disadvantages as well, and under certain circumstances, they clearly outweigh the advantages. A principal drawback is that the annual approach is usually not the most economical way to buy items when production runs span several years. In a June 3, 1981, report, *Multiyear Au-*



U.S. NAVY PHOTO

The MK-46 torpedo program is a good example of the kind of success possible with multiyear procurement. Actual savings are now \$150 million, nearly four times the expected amount.

Authorizations for Research and Development, the U.S. General Accounting Office cited several other major shortcomings: annual contracting inhibits long-range planning, prevents large-scale viewing of cross-agency programs because of time constraints, makes long-term efforts vulnerable to budget cuts and program interruptions, and offers insufficient time for program managers to establish priorities. Consequently, in September 1983, DoD expanded Directive 7200.4 to include provisions on multiyear procurement.

Not surprisingly, given problems such as those just listed, the private sector tends to view annual contracting as a dubious proposition. From industry's perspective, the approach leads to uncertain production schedules, results in additional administrative costs, and eliminates savings otherwise obtainable through high-volume purchases of material and bigger production runs. Moreover, in light of Congress's prerogative to reduce program financing, firms are often reluctant to make capital investments, the result of which is less efficient production and reduced competition.

Realities such as these motivated DoD and the Congress to take action to reduce the number of unstable acquisition programs. And I was in his context at the

programs in the most efficient and economical manner possible. The charge given to him by Secretary of Defense Caspar W. Weinberger led to formulation of a new DoD acquisition policy based on guidelines now known as the Carlucci initiatives, first outlined in an April 30, 1981, memorandum.

As noted above, the initiative generally recognized as essential to acquisition reform was that calling for increased use of multiyear procurement, or contracting for more than the current year's requirement. By funding economic lot buys, multiyear procurement frees manufacturers from having to make smaller, more costly piecemeal buys and thus promises to reduce the cost of mature, low-risk programs already in production. Officials and managers in government, DoD, and defense industry generally agree that, properly administered, multiyear procurement arrangements on selected acquisitions can be extremely beneficial.

Such contracts promote private-sector capital investment and encourage economies of scale. These benefits, in turn, can lead to improved efficiencies in production processes, better utilization of industrial facilities, and lower-defect, higher-quality products. Multiyear procurement arrangements also help stabilize the work force size and quality and enable industrial engineers to focus their efforts on improving learning curves.

In addition, by generating greater competition at prime, vendor, and subcontractor levels and by encouraging greater participation on the part of small and

should surge capability and logistics sustainability.

Multiyear contracts also motivate contractors to accomplish meaningful long-range planning and make them more amenable to buying strategic materials in bulk, a practice that lessens the dangers associated with overseas sourcing. As program stability increases, contractors will incur lower financial borrowing costs, and contract administration costs will decrease as well. To the extent that these and other benefits accrue, acquisition time probably will decline and program stretch-outs, which contribute significantly to cost overruns, should be sharply curtailed.

Originally, industry and government representatives estimated that multiyear defense contracting would net constant-dollar savings of approximately 10 percent. While savings have not always been at that level, projected savings from multiyear procurement initiatives in the FY 1984 procurement budget alone totaled nearly \$1.6 billion. In fact, of the 23 multiyear procurement programs approved for fiscal years 1982 through 1984, only two, the AN/TRC-170 radio and the MK-45 gun mount, failed to meet or exceed their total projected cost savings. On a per-unit basis, even the MK-45 program is experiencing a higher percentage of savings than was projected; the total production quantity, however, is lower. A good example of the kind of success possible with multiyear arrangements is the MK-46 torpedo program, the actual savings for which are now \$150 million, nearly four times the expected amount.

Industry and government officials also acknowledge that, used inappropriately, multiyear procurement will yield very different results. If a consensus is lacking concerning the need for a weapon system, if the design is unstable, or if cost estimates are far off the mark, the multiyear approach will reduce DoD's flexibility in responding to changes in threat, economic conditions, and technology. This and other risks associated with multiyear procurement are very real and must be recognized so that they can be kept to a minimum.

Another concern is that the government, hoping to prevent a "loss of savings" and avoid the high cost of cancellation, might become increasingly reluctant to abolish programs. Also, future Congresses and defense secretaries could inherit greater financial obligations and have less room to maneuver because multiyear procurement will account for a larger portion of DoD's total obligational authority, thereby reducing funds available for higher-priority programs unless a significant penalty is incurred. In addition, legislators have misgiv-

Certain factors inherent in the acquisition process can undermine the effectiveness of the multiyear approach. Obsolescence, scrappage and rework, and reconfiguration can all mean higher costs and greater risks, as can the hidden costs of storage, maintenance, and shelf-life or warranty expirations for advance procurement items. Because multiyear arrangements entail large purchases of production materials initially, they can also create significant cash flow problems and add to program risk if a contractor is not financially healthy.

Moreover, fostering competition could become more difficult. Once DoD awards a multiyear contract, opportunities to compete for follow-on buys may dwindle due to the high cost of tooling, which may deter prospective contractors from competing with existing ones. Another disadvantage is the resistance DoD is likely to encounter as it tries to convince the services and program managers to change direction once they are committed to a particular acquisition strategy.

Although criteria exist to help managers select systems appropriate for multiyear procurement, the decision-making process still calls for a great deal of subjective judgment. Ideally, managers should use the approach only for programs that have continuing requirements consonant with current plans, that run little risk of contract cancellation, and that have a stable design with low technical risk. Cost estimates for the program should be realistic as well.

A policy memorandum issued by the office of the secretary of defense in May 1981 outlines several basic guidelines to apply in evaluating the multiyear approach. For example, is the potential there for significant cost savings? Systems with greater risk to the government should offer greater opportunities for cost savings and other benefits. Also, procurement requirements should be stable. In other words, the total number of items needed and the desired delivery rates should be likely to remain steady during the contract period.

Furthermore, officials should have reasonable expectations that successive annual budget requests, authorizations, and appropriations will provide the necessary level of funding through the contract period. Items contracted on a multiyear basis should enjoy a level of priority as high as or higher than that of other items against which they must compete for resources. They should be fully developed, tested, and technically mature as well and have low probability of requiring expensive engineering changes, modifications, or retrofits during the contract period. Any anticipated changes should be

Multiyear procurement programs and their expected savings

1000

Approved Programs - FY 82

- F-16 Airframe
- AN/TRC-170 Radio
- C-2 Airframe

1500

- Blackhawk Airframe
- AN/ALQ-136 Jammer
- SM-1 Rocket Motor
- M-1 Fire Control
- NAVSTAR GPS

1500

Approved Programs - FY 83

- Multiple Launch Rocket System
- Blackhawk Engine
- KC-10
- NATO Sea Sparrow
- MK-46 Torpedo

1500

- Defense Meteorological Satellite Program
- AH-64 Engine
- M-60 Tank Thermal Sight
- M-2 Bradley Fighting Vehicle Components

2000

Approved Programs - FY 84

- B-1 Airframe & Major Subsystems
- TB-16 Towed Array
- MK-45 Gun Mount/MK-46 Hoist
- Armored Combat Earth Mover
- B-1B Spares

600

- A-6E Tank

Proposed Programs - FY 85

- UH-60 Airframe
- Defense Satellite Communications System
- CH-53 Airframe
- Shop Equipment/Contact Maintenance Truck
- F-16 Airframe (follow on)
- F-16 Simulator
- AN/SSQ-36 Sonarbuoys
- CH-47 Modernization Program

400

200

- M-2 Bradley Turret Drive
- Bushmaster 25mm Gun
- 6-Ton Truck
- TOW Missiles

ble cost, preferably under both annual and multiyear arrangements. Reasonably accurate cost estimates are essential and should be based either on the cost history of the same or similar items or on proven cost-estimating techniques. Confidence in the management skills and production capabilities of the potential prime contractors and subcontractors is also important.

Program stability is the common denominator in all of the above criteria. Obviously, any program under consideration for multiyear procurement has inherent risks for which there are no surefire safeguards. Nonetheless, decision-makers and other key players can use these benchmarks to help ensure that only mature, viable programs that have a minimum of built-in risk are chosen for multiyear procurement.

The complexity of the system will largely determine the year in which multiyear procurement should begin. For systems well within the current state of technology, the first production run might be the right starting point, provided there were no major problems during full-scale development. Systems on the cutting edge of technology are generally not appropriate for the multiyear approach until the system's design has stabilized, usually after two or three production runs.

Once a particular system has been identified as a candidate for multiyear procurement, the program manager should do a comprehensive cost analysis to determine if the expected savings justify the risks. In a sole-sourced situation, he or she can ask the contractor for help in assessing the nature of the risk and the prospects for cost savings. In a competitive environment, the program manager has little choice but to produce in-house estimates that are generally less accurate than those for sole-source buys. Either way, computing potential savings attributable to a multiyear procurement is an imprecise exercise that can be both time-consuming and expensive. What's more, the level of difficulty increases as savings and risks are projected further into the future. Refining such analysis represents one of the biggest challenges facing the government in its effort to select programs that are appropriate for multiyear procurement.

For the past several decades, largely due to the program instability discussed above, private firms have been dropping out of the defense arena. Sometimes bankruptcy has forced a departure; other times a firm has consciously shifted to a purely commercial thrust. Whatever the cause, this trend has reduced the size and vitality of the nation's defense industrial base. Many of the firms that remain are discouraged by excessive gov-

interest rates charged to them become an issue. Involved in defense manufacturing. Not surprisingly, these companies have trimmed their staffs and forgone capital investments that could upgrade production capability and reduce long-term costs.

Applied and administered properly, multiyear procurement could inject new vigor into the industrial base, particularly at the subcontractor level, where the decline has been severest. If not used prudently, however, the approach could exacerbate the problem. Poorly directed multiyear arrangements could actually lock contractors and their selected subcontractors into de facto single-source setups and thus discourage competition. Attempts to profit quickly from large-lot orders could also

to improve the acquisition process. Doing business with the government becomes a more attractive proposition than it is now. DoD must do a better job of articulating its resource requirements to Congress, which in turn must overcome political parochialisms and base its decisions solely on national interest.

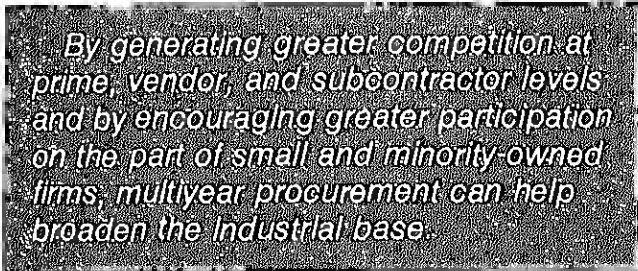
Although Congress has expanded DoD's authority to enter into multiyear agreements, it also has placed so many restrictions on their use that contracting personnel are often discouraged from making it part of their acquisition strategy. Of the 14 proposed multiyear programs contained in the FY 1984 Defense Authorization Act, only seven won congressional approval. Then-Deputy Secretary of Defense Paul Thayer estimated that, as a result, DoD lost out on potential cost savings of \$1 billion.

In light of the high visibility accorded multiyear procurement pilot programs, it is extremely critical that they fare well and realize the expected savings. Wider adoption of the multiyear approach could mean very substantial annual savings. Certainly, the savings already realized on systems such as the MK-46 torpedo bode well for such projections.

The defense acquisition community is paying close attention to the multiyear procurement initiative. Will Congress and DoD cooperate on this issue? Will they accept the implicit obligation to maintain the stability of programs that have been placed in multiyear status? Failure to assure stability will result in reduced savings and disruption of delivery, consequences that eventually will lead to loss of congressional, DoD, and private-sector support of the multiyear approach.

By no means is multiyear contracting a panacea for all the ills of the defense acquisition system. Nonetheless, if applied with discretion in the appropriate circumstances, it represents an effective and proven way to reduce acquisition costs, shorten lead times, and strengthen the nation's industrial base. **DMJ**

MAJOR DANTON G. STEELE II, USA, is a procurement management officer in the project manager's office for the Sergeant York Division Air Defense Gun System, U.S. Army Armament Research and Development Command, Dover, New Jersey. He is a graduate of the Armed Forces Staff College and has completed the program manager's course at the Defense Systems Management College and the logistics executive development course at the Army Logistics Management Center. Major Steele holds a bachelor's degree from the U.S. Military Academy and a master's degree in con-

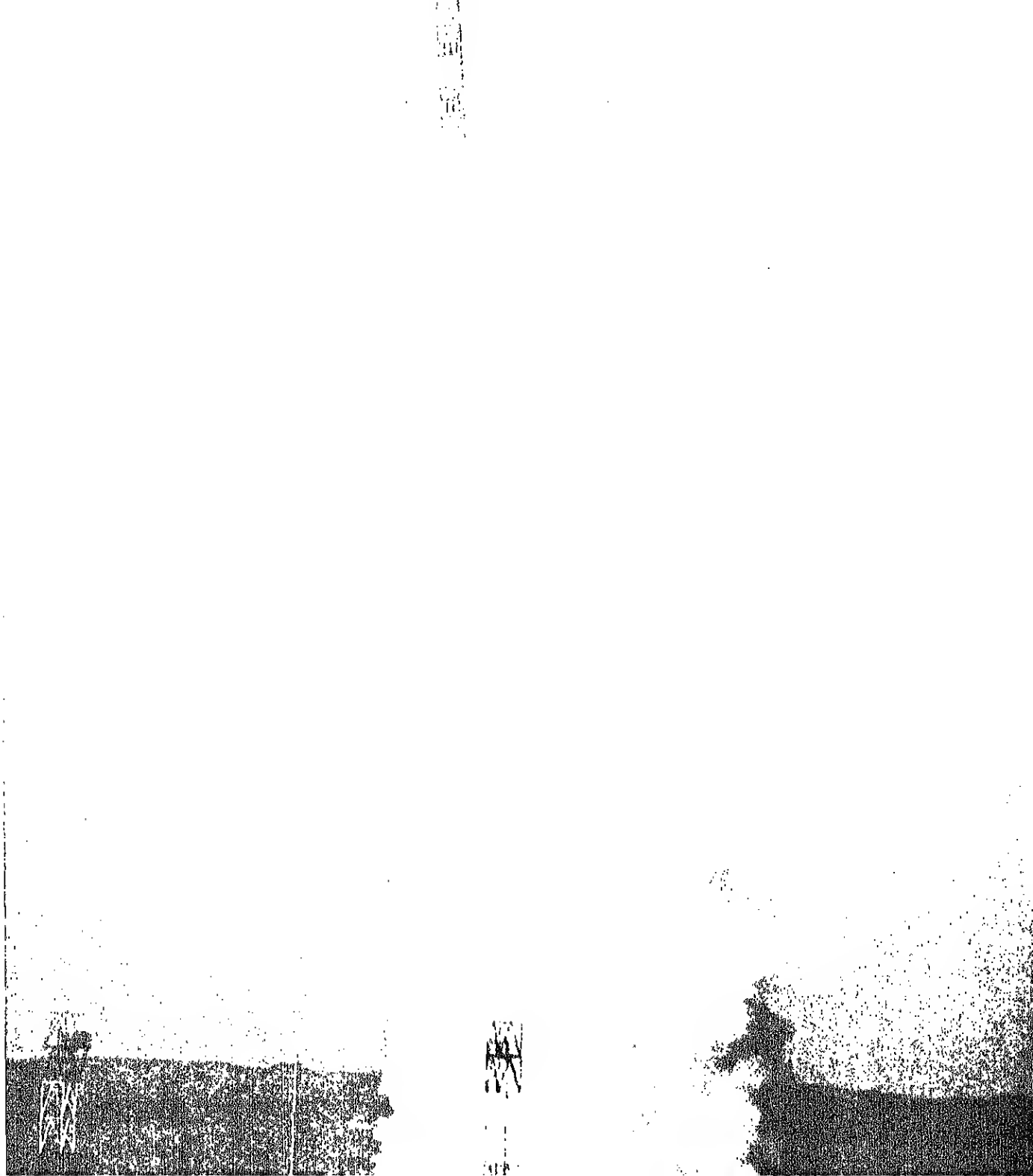


By generating greater competition at prime, vendor, and subcontractor levels and by encouraging greater participation on the part of small and minority-owned firms, multiyear procurement can help broaden the industrial base.

lead to problems. For example, subcontractors might fill large, one-time, short-duration orders from primes by using existing facilities rather than investing in new capital equipment. Additionally, prime contractors who sign long-term agreements could develop in-house capability to produce parts and components, thereby excluding prospective subcontractors.

DoD can minimize such dangers, though, through effective contract design and management. For instance, multiyear arrangements should call for a thorough review of the prime contractor's make-or-buy plan to ensure that subcontractors share equitably in any benefits that accrue. Also, the department needs to devise an effective means for evaluating the critical subcontractors' planned production rates so that it can take measures to protect other subcontractors involved from experiencing demand fluctuations that discourage capital investment. Furthermore, by incorporating second-source and dual-source provisions in multiyear contracts, DoD can spur expansion of the subcontractor tier and thereby increase both competition and the number of firms capable of producing defense-related items.

As it implements multiyear procurement, the government must recognize and accept that costs may rise ini-



of major defense acquisitions

By BRIGADIER GENERAL GORDON E. FORNELL, USAF
and

LIEUTENANT COLONEL GLENN H. VOGEL, USAF

Defense Department analysts have achieved a breakthrough in their ability to forecast the economic impact of weapon systems acquisition programs such as the Peacekeeper missile system.

A weapon system costs money—often a lot of money—and the price tag it carries is typically at the forefront of any discussion of its merits. What receives less attention are the dividends such an investment pays, though they too are substantial and of more than passing interest to decision-makers, planners, and direct beneficiaries alike. This article describes a methodology for assessing the economic impact of one major weapons program, the Peacekeeper missile, and explains some of the economic ramifications deriving from acquisition of that system.¹

Current plans call for full operational deployment of the Peacekeeper in existing Minuteman silos by 1989. (See the sidebar on p. 31 for more information on the missile itself.) For fiscal years 1984 through 1988, program expenditures will total some \$11.76 billion, including funds for missile research, development, test, and evaluation; missile procurement; and construction improvements to existing silos.² At both the regional and national levels, these efforts will no doubt have significant impact on production, employment, and demand for materials.

The Defense Economic Impact Modeling System, a forecasting tool recently developed by DoD, allowed

analysts to determine more precisely just what the likely economic effects of the Peacekeeper program would be. Analysts used the system in conjunction with the Bureau of Labor Statistics Economic Growth Input-Output Model in estimating the impacts. The U.S. Air Force furnished schedule and cost data as input for the models. (Cost data cited in this article reflect changes noted in the Conference Report of the House and Senate Appropriations Committee, October 10, 1984.)

Preliminary analysis, conducted for the 1984 Five Year Defense Plan, yielded detailed estimates of impacts in three principal areas: direct and indirect output and employment for Peacekeeper-related industries, induced employment, and demand for various categories of skilled labor and critical materials. Employment estimates included a regional breakdown based on the geographic distribution of major affected industries.

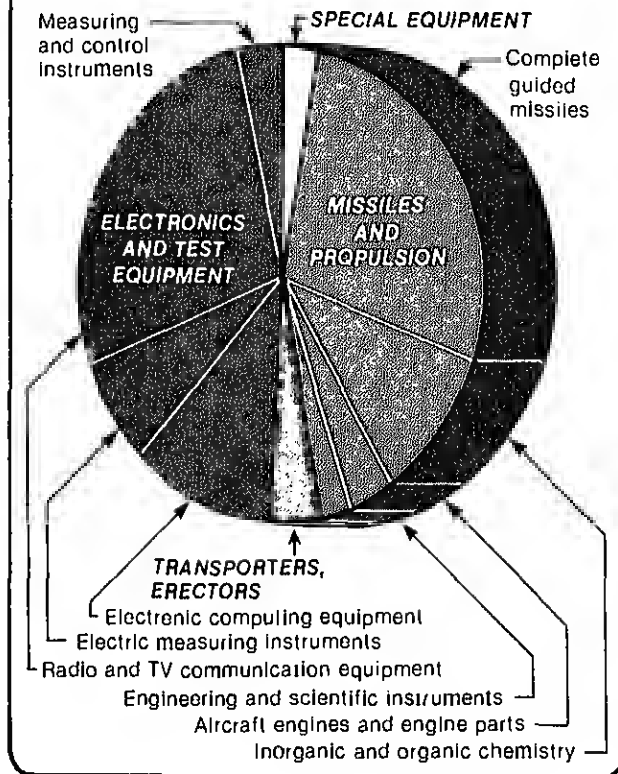
Estimates of procurement costs for the system as-

¹The analysis presented here is a revised summary of a paper presented at the Allied Social Sciences Association meetings in San Francisco, California, on December 28, 1983. The authors wish to express their appreciation to Dr. Kris Swaminatha, senior economist with ANSER, for his contributions to this article. Also, thanks are due to Dr. David Blond, Office of the Secretary of Defense, for his helpful comments and suggestions on an earlier draft of this paper.

²All dollar figures are expressed in constant 1982 dollars and all years refer to fiscal years.

The Peacekeeper is presently undergoing test flights. For FY 1984 through 1988, program expenditures will total more than \$11 billion, including funds for RDT&E, procurement, and construction improvements to existing silos.

Figure 1. Expected allocation of money for RDT&E and production of the Peacekeeper as projected by the Defense Economic Impact Modeling System



sumed a total buy of 223 missiles, 100 sets of operational support equipment, and initial spares. Current plans anticipate a maximum buy of 48 missiles per year and a three-year deployment schedule. Research, development, test, and evaluation outlays are expected to peak in 1984 and then taper off as the missiles go into full production. Correspondingly, procurement outlays are likely to be greatest from 1986 through 1988, as the manufacturers execute efficient production plans and tool up their factories.

To determine output and employment impacts resulting from an expenditure, analysts need to know actual amounts spent each year. Outlays for a given year are not necessarily the same as amounts budgeted; once funds are appropriated, they may be spent over a number of years. In the case of the Peacekeeper, Defense Department guidelines pertaining to expenditures for

Figure 2. Estimates of sales and employment potential for industries affected by development and procurement of the Peacekeeper

INDUSTRY

Radio and TV communications equipment
Complete guided missiles
Electronic computing equipment
Inorganic and organic chemistry
Semiconductors
Electric measuring instruments
Other electronic components
Miscellaneous business services
Aircraft engines and engine parts
Real estate
Wholesale trade
Measuring and control instruments
Blas furnaces and steel mills
Eating and drinking places
Other aircraft parts and equipment
Engineering and scientific instruments
Miscellaneous professional services
Miscellaneous machinery
Communications (except radio and TV)
Electric utilities
Miscellaneous plastic products
Advertising
Crude petroleum and natural gas
Motor vehicles
Special dies, tools, and accessories
Truck trailers
Other maintenance and repair
Motor freight
Machine tools and metal cutting
Metal stampings
Total for 30 Major Industries
Total for 400 Affected Industries

* Annual average for FY 84-88

appropriations to annual outlays.

The approach used in assessing and employment impacts of the involved five steps. The objective industries affected, estimate their put) potential, and project the employment resulting from Peacekeeper-related. Analysts measured the growth potential for the country overall in

Step 1. Staff members initially

the program would have an impact on, and determined employment-to-output ratios in each industry affected.

Step 2. To carry out the second step—deriving input-output coefficients for the budget categories—economists applied the interindustry model segment of the Defense Economic Impact Modeling System. By using it in conjunction with the latest version of the defense translator for the Peacekeeper, they were able to determine input requirements for each of the 400 supplying industries involved in system research, development, test, and evaluation and in system acquisition. (The translator is a set of coefficients used to restate budget outlays as purchases from industry.) Similarly, the Bureau of Labor Statistics Economic Growth Input-Output Model allowed economists to project input requirements for each of the 156 industries participating in Peacekeeper silo construction and improvement activities.

The Defense Economic Impact Modeling System, which figured prominently in this step and in step four below, permits users to analyze with some degree of precision the impact of DoD budget categories on the national economy and on industry and service sectors. Specifically, it:

- Gives analysts a consistent and reliable framework of economic models and government policy assumptions to use in assessing the economic impact of defense expenditures on the U.S. economy.
- Provides planning information on defense requirements to private-sector firms, in effect alerting them to sales opportunities and encouraging them to add additional capacity where needed.
- Allows DoD to evaluate the impact of alternative defense budgets on key industrial sectors, skilled labor categories, and raw material requirements.

The major segments of the system are a macroeconomic model that has been integrated with a 400-sector input-output (or interindustry) and employment model, a 72-commodity base strategic materials requirements model, and a 163-category occupational skills requirements model.

Step 3. The purpose of this step was to project increases in demand, or sales potential, for each industry affected by the program. To do so, analysts multiplied program outlays for each year by the input-output coefficients developed in step two. This third step assumed that the pattern of allocation of money for the research, development, test, and evaluation and production phases of Peacekeeper was similar to that of the translator

for the missile. The Bureau of Labor Statistics construction sector (standard industrial classification code 15).

Step 4. Next, analysts estimated the employment potential, or number of jobs likely to be created, by multiplying sales potential for each affected industry in each year by the associated employment-to-output ratios.

Step 5. Finally, staffers used two segments of the Defense Economic Impact Modeling System—the critical materials model and the occupation-by-industry model—to project requirements for strategic materials and skilled manpower that would result from the increased industrial production and employment generated by the program.

The industrial sales and employment forecasts derived by applying this methodology are approximations of the demand for particular services, products, and la-

The Peacekeeper

The Peacekeeper missile program responds to the critical need for modernization of our intercontinental ballistic missile forces. It should reverse the relative decline in our strategic capabilities and revitalize the U.S. strategic deterrent. The Peacekeeper is an advanced intercontinental ballistic missile capable of delivering 10 reentry vehicles, or warheads, to independent targets at ranges greater than 5,000 miles.

Each missile has four stages plus a post-boost vehicle consisting of a deployment module and reentry system. It weighs 195,000 pounds and is approximately 71 feet long and 92 inches in diameter. Compared to other intercontinental ballistic missile systems currently in the U.S. inventory, the Peacekeeper has greater resistance to nuclear effects, can carry more warheads, and boasts greater range and targeting flexibility. Important missile subsystems include: an advanced guidance set and three solid propellant booster stages.

The Peacekeeper will be deployed in existing Minuteman silos in Wyoming and Nebraska that are supported by F. E. Warren Air Force Base in Cheyenne, Wyoming. Because Peacekeeper was designed to fit into existing silos, required modifications to those silos will be minimal. As modified, the underground structures will accommodate new support equipment, a new shock isolation system, and an improved command and control system.

The Peacekeeper program schedule calls for initial operational capability of 10 missiles by late 1988 and

Figure 3. Projected annual-average employment increase as a result of the Peacekeeper missile program, FY 84-88

PROGRAM CATEGORY	OUTLAYS* (millions of FY 82 dollars)	EMPLOYMENT		
		Direct	Indirect	Induced
Research, development, test, and evaluation	1,016.2	11,040	10,550	12,000
Procurement	1,310.9	14,240	17,480	15,000
Silo modification	25.0	580	160	100
TOTAL	2,352.1	25,810	31,180	28,000

*Outlays do not include expenses related to operation, maintenance, and support activities.

bor. As such, each has certain inherent limitations. First, because physical quantities cannot be measured using this method and because the input-output series is stated in dollars, the estimates are value comparisons only. Second, the demand for various materials and services is influenced by technological development, design, and prices, all of which are subject to change over time; thus, the projections will require modification as additional information becomes available. Even so, the preliminary estimates are useful both for doing business market research and for analyzing the impact of government policy.

Figure 2 (p. 30) lists the estimates of sales and employment potential for various industries affected by development and procurement of the missile. From 1984 through 1988, estimated outlays for research, development, test, and evaluation and for procurement will total \$11.6 billion, exclusive of silo modifications, for an average annual expenditure of \$2.3 billion. To satisfy the demand that such outlays will create, various sectors of the economy will have to step up production activities and, as a result, will realize increased sales of approximately \$24.2 billion, or almost \$4.8 billion annually. Analysis of the sales projections indicates that:

- Thirty of the 400 industries affected will account for more than 84 percent of the total value of production and sales generated by research, development, test, and evaluation and procurement activity.

- Not unexpectedly, the missile industry's share in

- Other major industries benefit from the program are radio and TV communication equipment, electronic computing equipment, organic and inorganic chemicals (\$1.4 billion), and semiconductors (\$1.4 billion).

Expenditures for silo construction activities will be \$125 million over the five-year period, or an average of \$25 million each year. The economic impact of silo construction is significant.

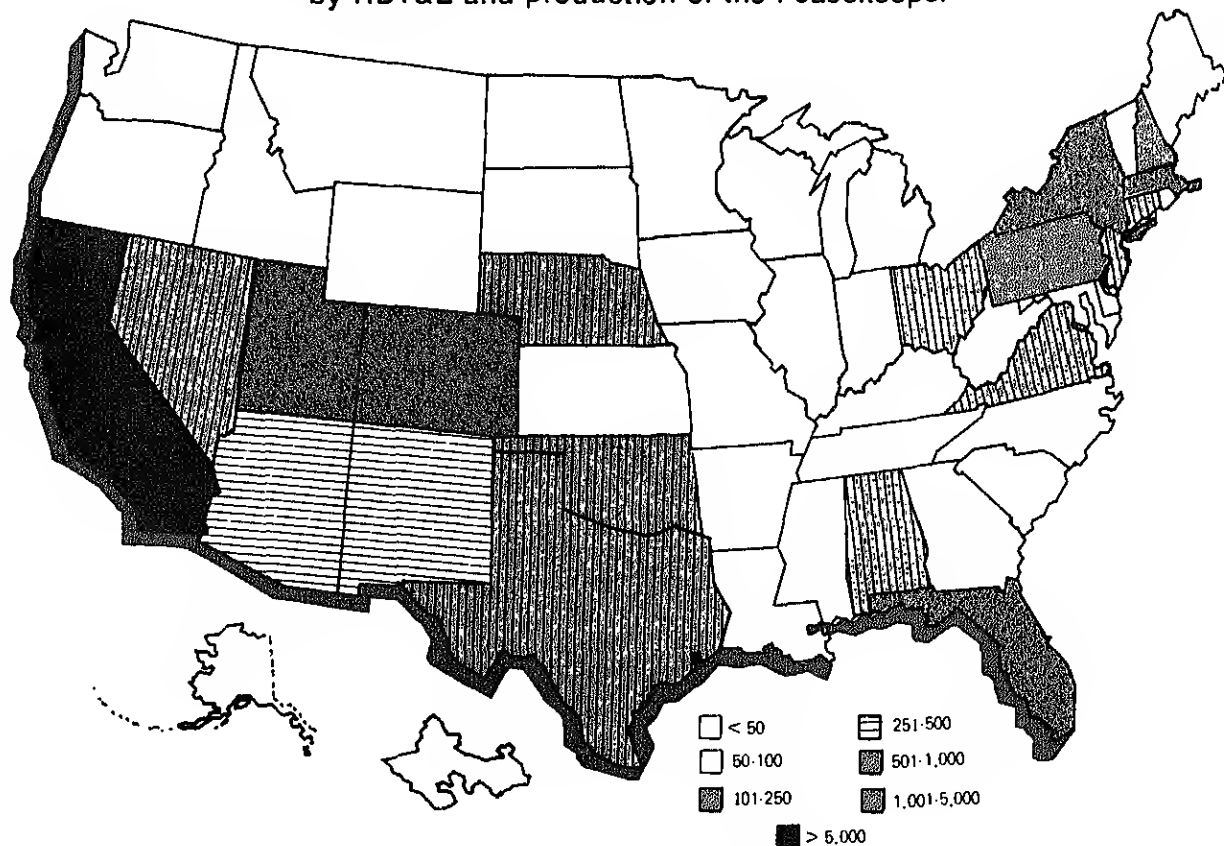
- The total value of production involved will increase by \$233 billion over the five-year period, an annual average value of \$46.6 billion.

- The major producing and supplying industries affected are fabricated structural metal products, professional services, cement and concrete products, retail trade, and fabricated metal products.

Additional jobs created due to the Peacekeeper fall into three categories: direct, indirect, and induced employment. Production of the missile will employ more workers in the first two categories. The multiplier effect results from the production-related activities. The following summarizes the projected employment by category. Overall, for the five-year period, the program should boost employment by 28,000 jobs.

All states will benefit from the program. The program will benefit from the employment and output associated with the program, but some stand to gain more than others.

Figure 4. Forecasted annual-average distribution of jobs directly created by RDT&E and production of the Peacekeeper



radio and TV communication, propulsion, and transportation equipment.

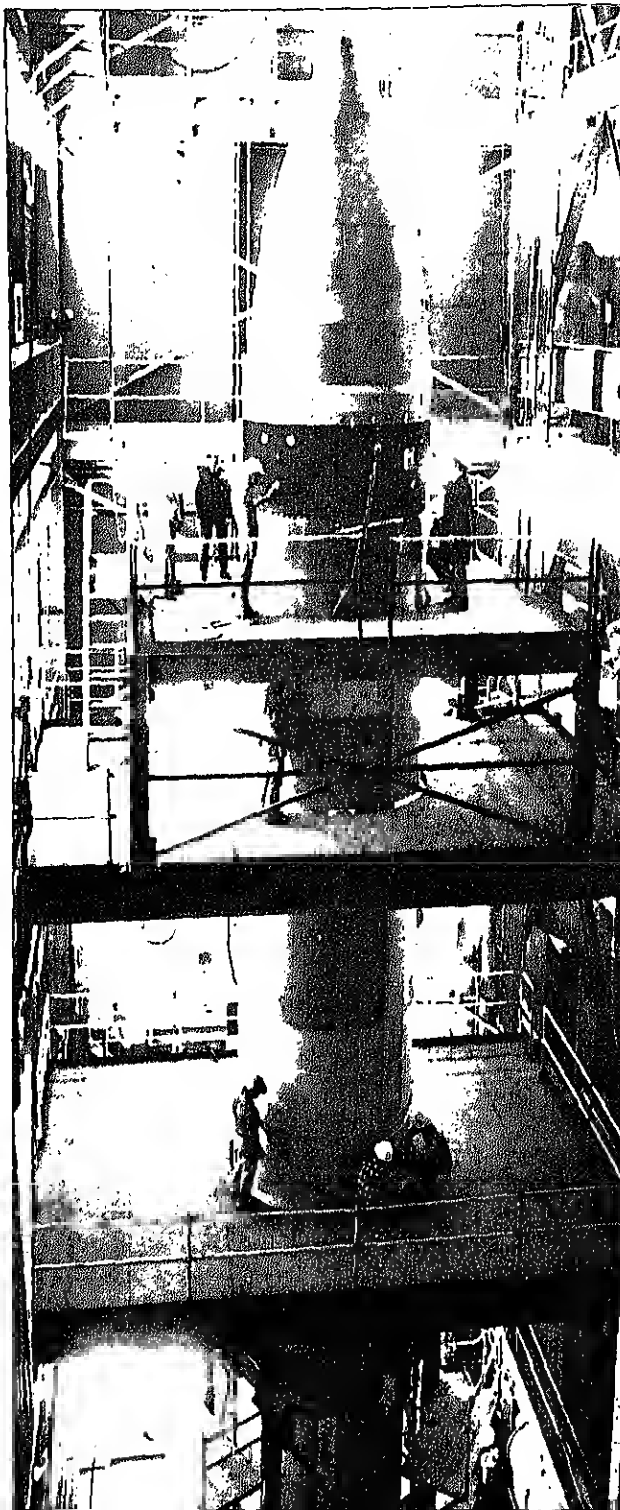
Preliminary analysis revealed that several large prime contractors, located in a few states, employed 75 percent of all workers directly engaged in Peacekeeper production in 1982. Subcontractor activities, scattered throughout the nation, accounted for the remaining 25 percent. Moreover, the concentration of prime contractors' employment and production activities is especially high in the Western states, as can be seen from Figure 4. Employment and income activity related to silo modification for the missile will be largely confined to southeastern Wyoming and western Nebraska.

Demand for skilled manpower will also grow as a result of the program. The Defense Economic Impact Modeling System includes an occupational skills requirements segment that helped analysts identify the most critical categories of skills needed, a critical

in demand and will result in some 56,310 additional jobs each year from 1984 through 1988. Major categories within that average annual total include: business professionals and staff (15,077), operatives (14,500), craft and related workers (8,244), engineers and scientists (7,032), service workers (4,308), social scientists and related professionals (3,121), and nonfarm laborers (2,806).

Another segment of the modeling system addresses strategic materials requirements. With the aid of this model, analysts were able to estimate the quantities of key materials required to produce 223 Peacekeepers from 1984 through 1988. Demand will be greatest for aluminum, chromium, copper, manganese, and nickel.

With actual expenditures approaching \$12 billion during fiscal years 1984-88, the planned development, procurement, and deployment of the Peacekeeper will clearly have significant economic impact throughout the



The Peacockkeeper dwarfs engineers. Aerospace, who are shown here checking equipment used in evaluating the missile through 1988, Peacockkeeper-related work rate more than 400,000 jobs.

skilled labor and strategic material nately, the availability of the Defense Modeling System enables analysts to liminary conclusions about the nature these effects.

Equally important, a wide ra tions—including major industries a state, and local governments—can p to good use. Though tentative, the do provide a framework for develo corporate investment strategy for pl In addition, these projections prov ssuming employment trends, defens ments, capital availability, and hous tailed work than that summari obviously be necessary to carry out ingful planning. Nonetheless, eve based on the Peacockkeeper program tial of the modeling system as a management tool. **DMJ**

BRIGADIER GENERAL GORI USAF, is special assistant for inte missile modernization matters in the chief of staff for research, develo tion, headquarters, U.S. Air For his present duties in 1982, he was velopment and production on the also served as program director fo Brigadier General Fornell is a gra College. He earned a bachelor's engineering from Michigan Stat M.B.A. from the Wharton Sc Pennsylvania.

LIEUTENANT COLONEL C USAF, is division chief, techn analysis, for the Peacockkeeper and continental ballistic missile now and development. His previous cluded MX system test manager i Office and MX requirements of

Logistics support costs for the B-1B aircraft can be reduced

U.S. General Accounting Office, Washington, DC (GAO/NSIAD-84-36, September 20, 1984). Request copies of GAO reports from: U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, MD 20760.

The Air Force plans to purchase 100 B-1B aircraft, a multipurpose bomber that will replace the B-52 in the strategic nuclear mission role. Expected to be capable of serving as a conventional bomber and as a cruise-missile carrier, the aircraft is being developed and produced concurrently in order to meet a congressional mandate that it be operational no later than 1987. The secretary of defense has informed Congress that the program will not exceed \$20.5 billion in 1981 dollars.

Logistics requirements were the focus of the General Accounting Office's recent review of the B-1B program. Specifically, they considered whether current plans for meeting those requirements are reasonable, or whether the Air Force could support the aircraft in a more efficient, cost-effective manner.

At the outset of its report, GAO acknowledges that Air Force support planning has been extensive, but states that planners have had to make premature logistics decisions because of two factors: the inadequacy of logistics data generated during research and development of the B-1B's predecessor—the B-1A—and the concurrency of B-1B development and production. Together, these factors have precluded an adequate logistics support analysis, the means through which planners normally obtain a detailed breakout of expected support requirements before production begins.

According to the report, the Air Force plans to spend billions of dollars for B-1B investment spares (components that can be repaired and reused) and production components during fiscal years 1985 and 1986. But experience with other aircraft acquisition programs strongly suggests that the service could cut these costs by as much as 20 percent if it combined orders for spares and components. Companies could then draw up one, overall production schedule and pass on savings realized through economies of scale and the avoidance of costs stemming from handling separate orders and from manu-

curement approach for initial provisioning of high-cost spares, which represent about 15 percent of the total spares buy. However, provisioning officials did little in 1982 to identify high-cost spares and consequently have not consolidated orders to the extent they could have. GAO's position is that the combined procurement approach should be used for all investment spares, and it estimated that failure to do so in FY 1983 may have resulted in lost savings ranging from \$8.3 million to \$16.6 million. It projected that combined purchases of B-1B investment spares in FY 1985 and FY 1986 could yield savings of 10 or perhaps 20 percent, or as much as \$880 million.

Citing the findings of several recent DoD studies of other acquisition programs, the GAO analysts recommended that the Air Force buy investment spares directly from the manufacturer rather than from the four major B-1B contractors. Current plans call for the service to make all spares purchases through the contractors, whose price tags are expected to reflect substantial add-on fees. According to a breakout analysis conducted by the B-1B program office in 1982, procurement officials could save at least 25 percent on direct purchases of any of the aircraft's 60 identified subsystems.

The Defense Department did not concur with the recommendation concerning direct purchase of spares. It maintains that the Air Force must continue to buy some spares from major contractors in order to comply with existing warranties and to assure quality control. But GAO contends that direct purchase from the manufacturer would not lessen the government's warranty protection since those firms are ultimately responsible for warranty work anyway. The manufacturers would simply be responsible to DoD, not to the four major contractors.

The study team also took exception to DoD's comment on quality control. It stated that the Air Force could readily assume much of the quality-control function now being performed by the B-1B contractors. However, the auditors did admit that the contractors may be able to provide some quality-control services that the Air Force cannot, and the team therefore recommended direct procurement of investment spares only when that procedure does not place product quality in jeopardy.

Next, GAO analysts considered the B-1B basing plan, which calls for deployment of 32 aircraft at one base, 26 at a second base, and 16 at each of two others. According to a study conducted by a private firm, consolidation of the latter two bases would not significantly increase facilities costs at the base selected. Moreover, GAO be-

report synopsis

and flight-simulator acquisition costs, and about \$25 million per year in personnel costs.

The Air Force expressed concern that a reduction in the number of bases would increase the vulnerability of aircraft on the ground. In response, the GAO team suggested deploying some of the strategic-alert aircraft at a fourth location, or a "satellite" base. Although there are costs associated with satellite basing, a 1979 DoD resource management study found that they are minimal compared with the savings available through consolidation, largely because a satellite base performs only three of the eight functions provided at a main operating base.

According to the report, use of satellite basing in conjunction with consolidation of the two proposed 16-aircraft bases would not reduce the number of alert aircraft. The B-1B is being designed to stand alert for 90 consecutive days with minimum maintenance but is scheduled to be on actual alert status for only 30 days at a time. Furthermore, a mobile repair team, which the Strategic Air Command plans to maintain at each main base, could correct any problems that do arise.

The Air Force also plans to operate an intermediate repair shop at each proposed B-1B base. Procurement of automatic test equipment and associated components at these four bases will cost an estimated \$122 million; personnel and operating costs over the expected 20-year life cycle will be approximately \$432 million. To reduce these costs and improve the quality of repair work, GAO recommended centralizing intermediate avionics repair at the airframe and engine depot maintenance facility. DoD did not agree. The department argued that the technologies to implement two levels of maintenance have not been adequately demonstrated and would pose undue risk to a nascent B-1B force. It also cited four Air Force studies which concluded that little or no cost savings would result from centralized B-1B avionics repair.

unsuited for military service. Recently, therefore, the Human Resources Research Organization attempted to identify demographic and education-related factors that correlate with an individual's suitability for military service.

Researchers surveyed 34,000 military applicants and 40,000 recruits during the first half of 1983. In a report based on data from that survey, the authors compared the demonstrated military suitability of recruits holding general educational development, or GED, credentials with that of high-school diploma graduates. The results of the analysis seem to support the policy of requiring nondiploma applicants to obtain an Armed Forces Qualification Test score higher than that required of high-school graduates.

Between 1977 and 1982, GED credential holders represented 5 percent of male and 7 percent of female nonprior service accessions. During this period, the proportion of GED accessions by service ranged from a low of 2.6 percent for the Marine Corps in 1979 to a high of 11.8 percent for the Navy in 1981. In fiscal years 1981 and 1982, approximately 4 percent of military recruits were GED holders, slightly more than the estimated percentage of 18-to-23-year-olds in the general population who held the credentials.

Because the military suitability of high-school graduates has traditionally been better than that of GED holders, all service branches give preference to applicants with high-school diplomas. While Army, Navy, and Air Force enlistment criteria are less stringent for equivalency certificate holders than for nongraduates, the Marine Corps does not distinguish between the two groups for enlistment purposes.

The researchers' findings indicate that the military suitability of GED recruits is in fact closer to that of nongraduates. In every Armed Forces Qualification Test category, the 36-month attrition rate for GED accessions was at least 20 percent higher than that for diploma graduates. Among 1979 accessions DoD-wide, GED holders had a higher first-term attrition rate than nongraduates in all but the highest three aptitude groups. The attrition rate for male GED accessions was nearly double that for all diploma graduates. Although female GED holders had

Characteristics and performance of recruits enlisted with general educational development credentials

rate is not sufficient to offset the negative effects of first-term attrition rates.

The Human Resources Research Organization conducted this comparative analysis partially in response to concerns expressed by the American Council on Education's GED Testing Service, which questioned the fairness of military enlistment criteria.

Better use of available data would improve mobilization planning for inductees

U.S. General Accounting Office, Washington, DC (GAO/NS/AD-85-11, October 22, 1984).

In the event of mobilization, the United States will have to increase the strength of its armed forces quickly. Current plans call for the Selective Service System to induct up to 100,000 individuals by the thirtieth day of mobilization; they will provide a significant portion of the manpower needed. GAO conducted this review to determine whether DoD has based its schedule for inductee deliveries on a thorough and valid analysis of mobilization personnel needs and on an accurate assessment of expected service manpower shortages and surpluses.

Presently, DoD employs the Wartime Manpower Planning System to determine the nature and magnitude of wartime personnel requirements. The system is helpful, but the GAO maintains it collects only aggregate data that do not allow planners to effectively identify military occupations likely to experience wartime manpower shortfalls. Though able to process occupational planning data in as many as 99 DoD job categories, the system is doing so for only five: combat; medical; logistics, service, and supply; technical, engineering, maintenance, and repair; and communications and intelligence.

By grouping many different and discrete occupations under just five broad categories, the approach can be misleading concerning occupational overages and shortages. Calculations of cumulative balances may be useful in orchestrating a peacetime force structure, but they mask imbalances that would occur in wartime. Moreover, DoD officials concede that the current level of statistical detail regarding possible imbalances is insufficient in several areas. It does not allow them to confidently determine post-mobilization accession requirements, skill area shortfalls, requirements for pre-trained individuals to bring units to wartime strength and to replace casualties,

Ironically, the services do have the desired information readily available but do not furnish it to DoD. Were they to do so, the department could more accurately assess wartime shortages by occupation, identify those needs that would require acceleration or expansion of reserve-component training, ensure the effective use of all available personnel, and determine the number of accessions needed within specific time frames. The authors cite "resistance" on the part of the services as the primary reason for DoD's failure to acquire the necessary data. They concluded that until the services provide occupational detail on their manpower needs, either through the Wartime Manpower Planning System or another mechanism, personnel delivery scheduling will not be as effective as it could and should be.

Specifically, the GAO analysts recommended that the secretary of defense:

- Require the services to submit sufficient occupational data through the Wartime Manpower Planning System or some other system so that DoD can ensure the accuracy of each service's wartime needs and expected manning shortages and surpluses.
- Ensure that requirements for inductees are based on a systematic analysis of the services' wartime needs and their ability to meet those needs with available personnel.
- Submit a revised personnel delivery schedule to the Selective Service System.

DoD partially agreed with the first recommendation and stated that it would develop and analyze the relevant data on a one-time basis. The department indicated that it would consider formal adoption of such an analytical procedure if the initial one led to substantial changes in either the inductee delivery schedule or the size of the mobilization training base.

Concurring in large measure with the second recommendation as well, DoD pledged to develop the necessary methodology for analyzing inductee requirements. However, the department disagreed with the report's contention that DoD does not use a systematic method for validating inductee requirements. Defense officials maintain that requirements validation is based on the fact that the Army, even after assimilating all 80,000 inductees it is scheduled to receive and after taking full advantage of the improving mobilization training-base capacity, would not be able to resolve all the skill shortages that would exist if mobilization occurred this decade.

In response to the third recommendation, DoD stated that if initial analysis substantiated the need for a revised schedule, it would direct the services to validate their in-

Appealing disciplinary action

By STEPHEN A. KLATSKY

Mr. Klatsky is the senior civilian personnel labor law counselor at the Army Materiel Command, Alexandria, Virginia.

A federal manager has the right to take disciplinary action against an employee (see Fourth Quarter 1984 *DMJ*, pp. 39-40). But as a check and balance against arbitrary use of this right, the subordinate also has access to statutory and regulatory systems through which he or she may either grieve the matter within the agency or appeal it to an outside administrative body. Therefore, when considering whether, and to what extent, discipline is warranted, the agency's management team—the supervisor and representatives of the legal and personnel offices—should anticipate an employee grievance or appeal, weigh the strengths and weaknesses of the case, and assess the likelihood that the discipline will withstand a challenge.

In cases of severe disciplinary action, that is, suspensions of more than 14 days or removal, the employee has the right to appeal to the Merit Systems Protection Board, a three-member administrative tribunal created under the 1978 Civil Service Reform Act. The board has established a body of case precedent that sets forth legal principles pertaining to appropriate penalty, burden of proof, procedural errors, and other issues in the area of discipline. Hearings before the board take place in a formal, evidentiary, trial-like setting.

Collective bargaining agreements make available another avenue of appeal. All such agreements negotiated between unions and management must

describe the types of conduct subject to discipline.

The first procedural steps delineated in most collective bargaining contracts require a review of the grievance by first- and second-line supervisors, and, if the matter remains unresolved, by the activity commander or director. By law, the last step of the procedure is binding arbitration. The parties involved hire an arbitrator of their choice from those on a list furnished by the Federal Mediation and Conciliation Service or some other mutually agreed-to source. The arbitrator interprets the contractual rights and obligations of the parties and decides whether the proposed discipline is for good cause. However, only the union has authority to invoke arbitration; if it chooses not to, the employee has no independent right to do so.

Individuals who are members of bargaining units usually must grieve under the negotiated provisions of the collective bargaining agreement. Only if the proposed disciplinary or performance-corrective actions meet the Merit Systems Protection Board jurisdictional requirement can a union member take his or her case to that tribunal. If the employee chooses this route, he or she forfeits the right to challenge under the collective bargaining agreement.

Another channel for appeals is the employing agency's internal administrative grievance system. The Office of Personnel Management requires all federal agencies to establish such a system for employees not covered by end subjects excluded from collective bargaining agreements. The administrative grievance system does not extend to matters appealable to the Merit Systems Protection Board. Though practice varies, normally this intra-agency mechanism leads to a hearing before a grievance panel or committee, which makes a nonbinding recommendation to management. Management retains final decision-making authority.

Regardless of whether the employee elects to appeal adverse actions to the Merit Systems Protection Board or through a negotiated grievance procedure,

the Office of Personnel Management has the right to seek judicial review of an unfavorable judgment.

An employee can challenge a disciplinary action on either procedural or substantive grounds. In cases based on the former, he or she alleges that management failed to grant a right employees have or made an error in processing the action. The more common procedural issues are management's timeliness in initiating the discipline, compliance with contractually established deadlines for completing each step of the grievance procedure, and violations of due-process rights.

In defending the timeliness of an action, the agency must be able to show that management, upon becoming aware of an employee's misconduct, did not wait an unreasonable length of time before initiating discipline. Unfortunately, the law sets forth no hard-and-fast rules concerning what constitutes "too long." Immediately after learning about an incident, a supervisor should consult with the civilian personnel office, which will typically advise him or her to conduct an informal fact-gathering inquiry to determine if discipline is warranted.

In a simple factual case—when a worker has taken an unduly long lunch for the third time in a month, for example—the supervisor normally offers the employee an opportunity to give a reason for the absence. Next, the supervisor reviews the matter with the civilian personnel office, taking into account the impact of the employee's absence on mission performance, the employee's past performance and conduct, and management's customary practice in disciplining similar cases. If management decides that discipline is warranted, it then issues the employee a proposal letter that describes the incident, states the proposed punishment, and outlines the employee's challenge rights.

A more complex case, one involving on-duty assault and battery, for instance, requires a more extensive investigation, including interviews with witnesses and colleagues. Coordination

are bringing criminal charges. Consequently, management usually has more time to propose discipline in such cases, though again no specific guidelines are available to ensure that management's action is timely. If an employee is charged with a serious, violent crime, the supervisor, with the concurrence of the civilian personnel and legal offices, may indefinitely suspend the individual, usually until criminal proceedings are exhausted.

Even when management is reasonably prompt in proposing discipline, it can still violate the time limits established for the various steps of a grievance action. Each collective bargaining agreement defines those limits both for

management based its action, and to written notification of their right to grieve or appeal.

The above rights are all due the employee as a matter of equity and fundamental fairness. Violations of any one of them, including lack of specificity, may result in reversal of management's actions on the theory that the denial prevented the employee from formulating and presenting an effective defense.

Employee challenges on substantive grounds generally involve one of the following issues: burden of proof, severity of penalty, or nexus.

To have a disciplinary action sustained, management must be able to demonstrate that it is for good cause,

is justified.

If an employee challenges on grounds that the proposed penalty is too severe, management must then show that the severity of the discipline is reasonable in light of the seriousness of the offense and its impact on the work environment. The employee will typically argue that penalties imposed on other agency employees in the past for the same or similar offenses were less stringent. If the individual can show that he or she has received disparate treatment or can otherwise convey the unfairness of the punishment, the decision-makers will reduce the penalty to one consistent with management's past practice or impose a penalty they consider more appropriate.

The absence of nexus, or connection between the misconduct and job performance, is likewise a common basis for substantive challenges. For the most part, the issue arises when employees have been disciplined for off-duty, nonwork-related misconduct. Nexus has been and continues to be a highly complex legal area, but generally management has the burden of proving that an individual's off-duty misconduct is related to and in some way seriously detracts from his or her job performance or the performance of other employees. Failure to adequately show nexus will lead to reversal of the discipline imposed.

However, if the misconduct consists of violent criminal behavior or is so egregious that it suggests moral turpitude, nexus is presumed by the Merit Systems Protection Board. In other words, management need not demonstrate that the behavior in question has impeded the individual's ability to carry out his or her duties. However, where the employee introduces evidence that overcomes the presumption, the burden shifts to management, which must prove a nexus to performance and efficiency of the service. Not surprisingly, cases based on presumed nexus receive exceptionally meticulous review, as appellate tribunals and decision-makers struggle to distinguish between off-duty behavior that implicitly relates to job performance and

Employees are entitled to a representative of their choice, to official time to prepare and present their case, to the evidentiary materials on which management based its action, and to written notification of their right to grieve or appeal.

management and employees. If management fails to respond to an employee's filed grievance within the specified number of days, for example, the employee can immediately escalate the grievance to the next step or perhaps even win by default. Similarly, should a worker violate established procedural time limits, management may be able to terminate the grievance.

Each grievance and appeal system also guarantees employees certain protections against arbitrary managerial action. Although specific rights of due process vary, some are common to all appeal systems. Among them are the right to written notification of the proposed discipline, including specific reasons for it, and the right to respond to the notice orally, in writing, or both. Except in situations involving appeals under negotiated grievance procedures, employees are also entitled to a representative of their choice. They are also entitled to a fair time to prepare and

will promote the efficiency of the agency, and meets the applicable legally defined burden of proof. Failure to satisfy any one of these requirements will lead to reversal of the proposed action.

If a manager wants to discipline an employee for a four-hour absence without leave, he or she must show that the employee was away from the worksite, that the individual was not on approved leave, and that management had a right to expect the employee to be working. Once management has established these facts, the burden of proof shifts to the employee who may contend that management orally granted him leave for the time in question. (Some bargaining agreements state that an oral request is sufficient when the leave requested is less than eight hours.) In such an instance, lack of a written request is not sufficient proof that leave was denied. The decision-maker, either the Merit Systems Protection Board or an arbitrator, would have to weigh the

'84 survey most successful in DMJ history

In the Second Quarter 1984 issue of the *Defense Management Journal*, we published a 14-question readership survey. Using a fearcard as our survey vehicle, we expected the normal response rate for that methodology, which is typically about 5 percent. Much to our surprise, 2,305 readers—more than 10 percent of our distribution—responded during the quarter-year that followed dissemination of that issue. This response rate is more than double the previous

best at the DMJ.

Analysis of the responses was revealing in a number of respects. Highlights of the analysis, keyed to the survey questions, follow.

Who is your employer? Army readers constituted more than a third of our respondents, with Navy and Air Force readers each comprising another fifth. The most noticeable shift in readership from a decade ago was among industry

and academic readers; in 1974, they represented 18 percent of respondents, but in 1984 they accounted for only 9.6 percent of respondents.

What is your rank or grade? Forty-eight percent of respondents were military and 43 percent were federal civilians. See the figure for a detailed breakdown.

How many years have you worked in your current job? As one might expect, two-thirds of military officers have been in their current jobs for fewer than 3 years. By contrast, only a fourth of GS-12 through GS/GM-15 civilian respondents had fewer than 3 years of tenure in their current jobs (indeed, more than a fourth of civilian managers have been in their jobs more than 15 years).

How do you normally obtain the DMJ? Eighty-six percent of respondents received their copy through government distribution. Personal subscriptions accounted for another 8.6 percent.

When did you receive this issue? Seventy percent received their copy within three weeks of distribution. All but 5 percent of respondents reported receipt within 7 weeks. By contrast, in 1978 it took more than 80 days for a third of respondents to receive a copy.

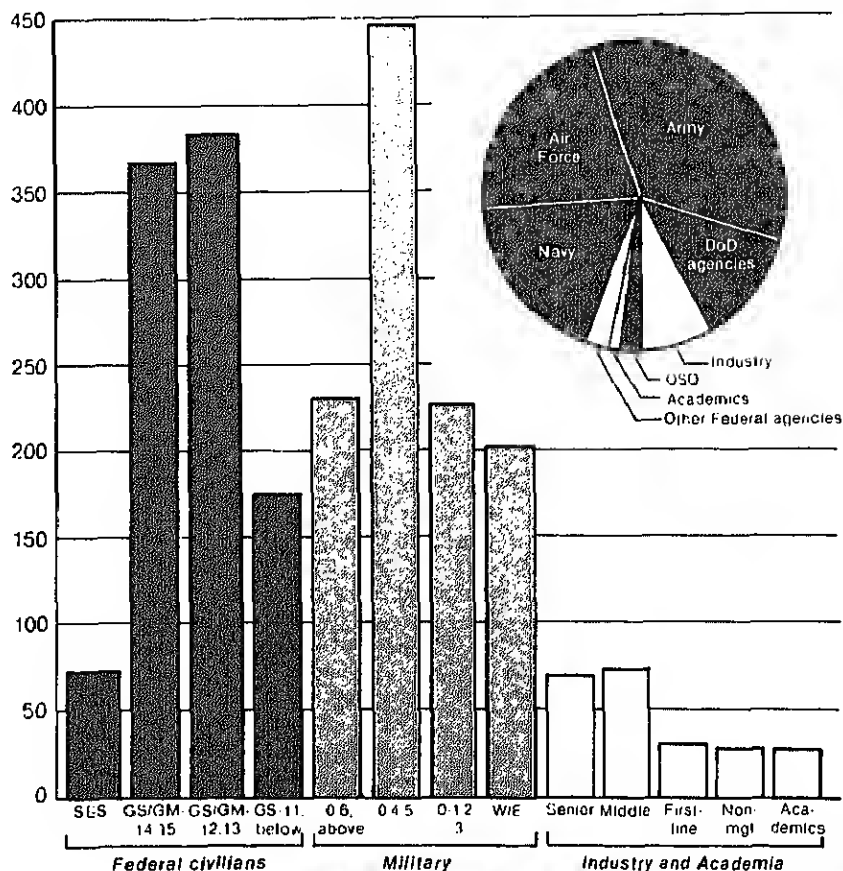
After reading the DMJ, what do you do with it? In 1976, 95 percent of respondents passed the DMJ on; in 1984, nearly one in five responded that he or she keeps the DMJ for personal reference.

How much of the DMJ do you usually read? More than half of all respondents read two or more articles per issue; a fifth skim most issues. Notably, 95 percent of senior industry managers read at least one article per issue.

On what primary basis do you determine the articles you will read? More than 58 percent of respondents make their selections based on the titles and contents pages. The remainder typically thumb through each issue.

Indicate the degree to which you find the following categories of material published in the DMJ valuable. Rated exceptional or superior by three-fourths of respondents were the contents pages and report synopses. News

Respondents' rank or grade and employer



summaries, graphs, and illustrations received such ratings from three of five respondents. *DMJ's* calendar fared most poorly, with 14 percent rating it of minimal value.

Indicate your degree of interest in each of the following subjects. More than half of the respondents expressed high or substantial interest in administration, training, personnel, acquisition, logistics, manpower, and research and engineering. Subjects that drew fewer than one in three nods include transportation, auditing, equal employment, health affairs, and reserve affairs (see the figure for details).

Identify as many as three items from the preceding list that you consider most relevant to your field of work. Again drawing the most responses was administration, followed by logistics, acquisition, research and engineering, and training. Of least relevance to *DMJ's* respondents were reserve affairs, transportation, auditing, health affairs, and equal employment—the last earmarked by only 3.5 percent of respondents.

What is your age? Almost two of every three respondents were at least 40 years of age (see the figure).

What is your sex? Males comprised 91 percent of respondents.

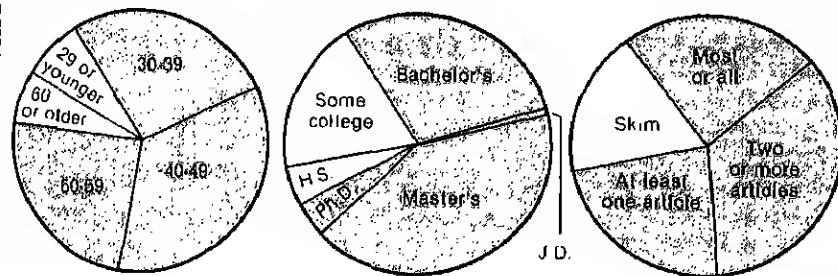
What is the highest level of education you've attained? Four of every five respondents laid claim to at least a bachelor's degree, and almost half have an advanced degree (see the figure).

Finally, more than 300 respondents took the time to provide written comments. To those couple of dozen readers who have "not much use" for the *DMJ*, we ask that you pass it along to someone who can use it (we're not interested in wasting the taxpayers' money any more than you are). To the more than 150 respondents who told us to "keep up the good work" we say thanks, we're doing our best. And especially to those six dozen readers who offered suggestions for articles, we tip our hats. This survey was conducted in the interest of improving the value of the *DMJ* to its primary audience, and your constructive comments are perfectly attuned to that spirit. While we are a somewhat physically austere publication—inex-

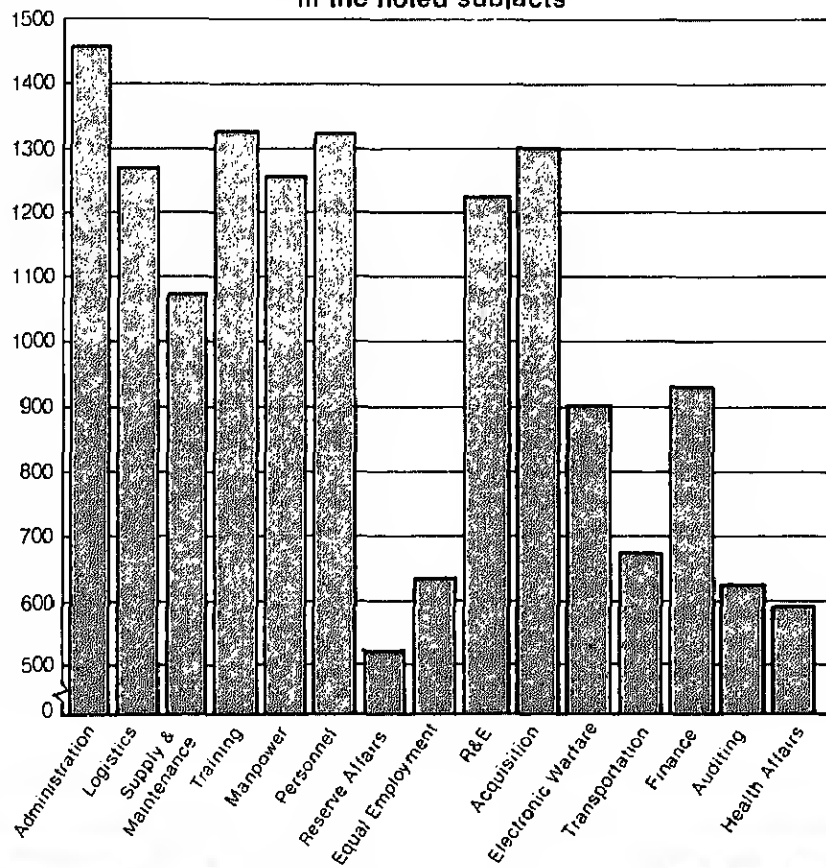
pensive paper stock, self-covers, and no internal color—we strive to ensure that

the *DMJ* is never intellectually austere. Thank you.

Respondents' age, level of education, and *DMJ* reading habits



Respondents expressing high or substantial interest in the noted subjects



news summary

Hotline proving a potent fraud buster

Since its inception in June 1981, the Defense Hotline for reporting fraud, waste, and abuse has received 23,400 tips, more than 7,600 of which have led to substantive investigations. Callers have reported irregularities ranging from automobile misuse to major contract fraud.

In 1984, the number of hotline calls and letters averaged 880 per month, about 360 more than the monthly average for each of the two preceding years. According to program officials, not only has the number of contacts increased, but so too has the quality of the information received. Currently, about one-third of the contacts are referred for in-depth view.

Examples of cases brought to light as a result of hotline tips include the following:

- Two GS-13 Navy civilian employees accepted for personal use promotional airline tickets given to them as a bonus for job-related travel. These two individuals intentionally failed to consign the tickets to the government and, as a result, received letters of reprimand and had to reimburse the government a total of \$6,597.

blanket that had been available for \$201 in 1982. Investigation revealed that a new manager, who failed to receive a procurement history data package, had procured the item on a sole-source basis. A competitive contract has since been awarded at a price of \$201 per item; projected three-year savings will amount to \$158,000.

- An Air Force officer was conducting personal business while on duty. As a representative of two retail firms, he was selling the firms' products to subordinates and other individuals. The officer received a fine of \$1,634 and opted to retire rather than face a general court-martial.

- Three DoD employees voluntarily reimbursed the government nearly \$1,000, which represented partial repayment of fraudulently obtained funds. An investi-

gation disclosed that they had knowingly submitted false lodging receipts to document payment for motel rooms during time they were actually at home. DoD also took action to recover the remainder of the money and to remove the employees from government service. (OASD (PA) news release: November 7, 1984)

Army to construct supply complex

The Army has begun preparing for construction of a \$174 million supply distribution center at New Cumberland Army Depot, Pennsylvania. Upon its completion in 1988, the 1.7-million-square-foot complex will be the largest, most modern military storage and distribution facility in the free world.

Floor space at the center will be roughly equivalent

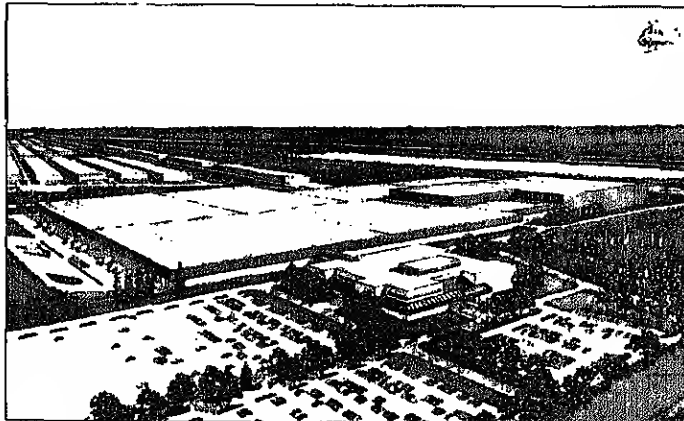
to 30 football fields. The receiving and shipping area will be large enough to accommodate the storage and distribution of 127 semi-trailers and sea vans. Additionally, the rail-loading dock and distribution center will have the capability to receive and ship 100 rail cars at once. The complex will also handle operations and maintenance of equipment and provide the space for 563 personnel.

New Cumberland Army Depot is the distribution point for more than 80 percent of Army materiel shipped to Europe. New Cumberland Army Depot news release: August 24, 1984; Army Times: November 5, 1984)

Ruling eases burden of proving nexus

A major decision recently handed down by the Merit Systems Protection Board makes it easier for a federal agency to dismiss an employee whose off-duty behavior reflects a low moral character or suggests that he or she may pose a physical danger to coworkers.

The case involved dismissal of a federal employee who was arrested and indicted for felonious conduct, including armed robbery. The board concluded that an agency could arbitrarily dismiss an individual whom civil au-



Most significantly, the board ruled that the agency could do so without proving a connection between such conduct and the individual's job performance. Proof of such a connection, or nexus, is a legal burden traditionally shouldered by the government. Under the new ruling, there is a presumption of nexus which the employee must disprove. (OPM news release: November 19, 1984)

AF unveils plans for munitions dispenser

Engineers at the Air Force Systems Command's Armament Division, Eglin AFB, Florida, are laying plans to develop an air-to-ground submunition dispenser that will be launched from advanced tactical fighter aircraft outside enemy high-threat areas.

Scheduled to begin in June 1985, the Advanced Weapon Carriage Integration Technology program represents the Air Force's first attempt to develop a weapon featuring conformal blended-body design. By reducing the drag commonly experienced with pylon weapons carriage, the conformal design will significantly increase the speed and range of tactical fighter aircraft, which will be able to carry as many as four of



Launched from stand-off range by tactical fighter aircraft, submunition dispensers will deliver their payloads to the target area while the launch aircraft remains outside high-threat airspace. (U.S. AIR FORCE ILLUSTRATION)

Advanced tactical aircraft equipped with the new systems will be able to "launch and leave," a capability that will enhance aircraft survivability. Air Force officials are hoping to begin flight testing in 1987. (USAF Systems Command Armament Division news release: October 10, 1984)

Carnegie-Mellon to run DoD software unit

The Department of Defense has selected Carnegie-Mellon University, in Pittsburgh, Pennsylvania, to implement and operate the department's new Software Engineering Institute.

As a federally funded research and development center, the Institute will support DoD efforts in software engineering. Spe-

software technology to areas such as intelligence, surveillance, and command and control. The center's mission will primarily focus on technology transition. Private-sector firms will continue to develop software for defense systems.

The institute will eventually be housed in a building scheduled to be constructed soon near the university's main complex. It is expected to be staffed by 250 personnel, mostly scientists and technicians. Policy and program guidance will be provided by a council consisting of the Joint Logistics Commanders and high-level representatives of the office of the secretary of defense and the major DoD agencies.

Contract performance will begin upon completion

operating the facility is \$103 million. (OASD (PA) news release: November 14, 1984; New York Times: November 15, 1984)

OPM promotes use of temporary workers

In a significant policy turnaround, the Office of Personnel Management has issued a directive that encourages federal agencies to hire temporary rather than career-status employees.

The policy clears the way for use of more temporary workers in positions up to and including those at the GS-12 level. Until now, temporary hires have filled predominantly GS-1 through GS-7 positions. The new policy also permits temporaries to remain on the payroll for four years before an OPM-approved extension is needed. In the past, this extension was necessary after just two years.

According to OPM officials, the policy shift is designed to correct a work force imbalance brought about by the disproportionate reduction in positions held by temporary workers during the past four years. They also see it as a cost-effective measure because temporaries do not participate in supplemental retirement and insurance programs. The initiative does not set savings or

news summary

Hotline proving a potent fraud buster

Since its inception in June 1981, the Defense Hotline for reporting fraud, waste, and abuse has received 23,400 tips, more than 7,600 of which have led to substantive investigations. Callers have reported irregularities ranging from automobile misuse to major contract fraud.

In 1984, the number of hotline calls and letters averaged 880 per month, about 380 more than the monthly average for each of the two preceding years. According to program officials, not only has the number of contacts increased, but so too has the quality of the information received. Currently, about one-third of the contacts are referred for in-depth review.

Examples of cases brought to light as a result of hotline tips include the following:

- Two GS-13 Navy civilian employees accepted for personal use promotional airline tickets given to them as a bonus for job-related travel. These two individuals intentionally failed to consign the tickets to the government and, as a result, received letters of reprimand and had to reimburse the government a total of \$5,597.

- In 1983 a DoD activist

blanket that had been available for \$201 in 1982. Investigation revealed that a new manager, who failed to receive a procurement history data package, had procured the item on a sole-source basis. A competitive contract has since been awarded at a price of \$201 per item; projected three-year savings will amount to \$158,000.

- An Air Force officer was conducting personal business while on duty. As a representative of two retail firms, he was selling the firms' products to subordinates and other individuals. The officer received a fine of \$1,634 and opted to retire rather than face a general court-martial.

- Three DoD employees voluntarily reimbursed the government nearly \$1,000, which represented partial repayment of fraudulently obtained funds. An investi-

gation disclosed that they had knowingly submitted false lodging receipts to document payment for motel rooms during time they were actually at home. DoD also took action to recover the remainder of the money and to remove the employees from government service. (OASD (PA) news release: November 7, 1984)

Army to construct supply complex

The Army has begun preparing for construction of a \$174 million supply distribution center at New Cumberland Army Depot, Pennsylvania. Upon its completion in 1988, the 1.7-million-square-foot complex will be the largest, most modern military storage and distribution facility in the free world.

Floor space at the center will be roughly equivalent

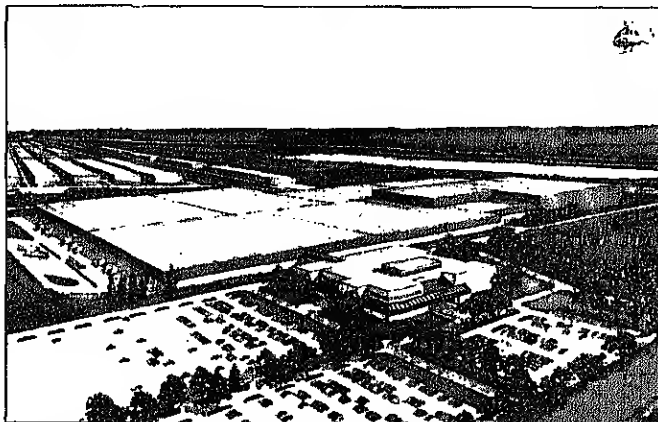
to 30 football fields. The receiving and loading dock will be large enough to accommodate any combination of 127 semitrailers and sea vans. Additionally, a rail-loading dock inside the center will have the capacity to receive four 80-foot rail cars at once. The complex will also house an operations and support element and provide office space for 563 personnel.

New Cumberland Army Depot is the distribution point for more than 90 percent of Army supplies shipped to Europe. (New Cumberland Army Depot news release: August 24, 1984; Army Times: November 5, 1984)

Ruling eases burden of proving nexus

A major decision recently handed down by the Merit Systems Protection Board makes it easier for a federal agency to dismiss an employee whose off-duty behavior reflects a low moral character or suggests that he or she may pose a physical danger to coworkers.

The case involved dismissal of a federal employee who was arrested and indicted for felonious conduct, including armed robbery. The board concluded that an agency could arbitrarily dismiss an individual whom civil authorities had charged with what could be reasonably



Construction of New Cumberland Army Depot's \$174 million distribution center. It will be completed by March 1988. The

Most significantly, the board ruled that the agency could do so without proving a connection between such conduct and the individual's job performance. Proof of such a connection, or nexus, is a legal burden traditionally shouldered by the government. Under the new ruling, there is a presumption of nexus which the employee must disprove. (OPM news release: November 19, 1984)

AF unveils plans for munitions dispenser

Engineers at the Air Force Systems Command's Armament Division, Eglin AFB, Florida, are laying plans to develop an air-to-ground submunition dispenser that will be launched from advanced tactical fighter aircraft outside enemy high-threat areas.

Scheduled to begin in June 1985, the Advanced Weapon Carriage Integration Technology program represents the Air Force's first attempt to develop a weapon featuring conformal blended-body design. By reducing the drag commonly experienced with pylon weapons carriage, the conformal design will significantly increase the speed and range of tactical fighter aircraft, which will be able to carry as many as four or



Launched from stand-off range by tactical fighter aircraft, submunition dispensers will deliver their payloads to the target area while the launch aircraft remains outside high-threat airspace. (U.S. AIR FORCE ILLUSTRATION)

Advanced tactical aircraft equipped with the new systems will be able to "launch and leave," a capability that will enhance aircraft survivability. Air Force officials are hoping to begin flight testing in 1987. (USAF Systems Command Armament Division news release: October 10, 1984)

Carnegie-Mellon to run DoD software unit

The Department of Defense has selected Carnegie-Mellon University, in Pittsburgh, Pennsylvania, to implement and operate the department's new Software Engineering Institute.

As a federally funded research and development center, the institute will support DoD efforts in software engineering and

software technology to areas such as intelligence, surveillance, and command and control. The center's mission will primarily focus on technology transition. Private-sector firms will continue to develop software for defense systems.

The institute will eventually be housed in a building scheduled to be constructed soon near the university's main complex. It is expected to be staffed by 250 personnel, mostly scientists and technicians. Policy and program guidance will be provided by a council consisting of the Joint Logistics Commanders and high-level representatives of the office of the secretary of defense and the major DoD agencies.

Contract performance will begin upon completion

operating the facility is \$103 million. (OASD (PA) news release: November 14, 1984; New York Times: November 15, 1984)

OPM promotes use of temporary workers

In a significant policy turnaround, the Office of Personnel Management has issued a directive that encourages federal agencies to hire temporary rather than career-status employees.

The policy clears the way for use of more temporary workers in positions up to and including those at the GS-12 level. Until now, temporary hires have filled predominantly GS-1 through GS-7 positions. The new policy also permits temporaries to remain on the payroll for four years before an OPM-approved extension is needed. In the past, this extension was necessary after just two years.

According to OPM officials, the policy shift is designed to correct a work force imbalance brought about by the disproportionate reduction in positions held by temporary workers during the past four years. They also see it as a cost-effective measure because temporaries do not participate in supplemental retirement and insurance programs. The initiative does not set savings or

employees represent about 8 percent of the federal work force. (*New York Times*: January 2, 1985; *Washington Post*: January 3, 1985)

Forecasts offered on DoD spending trends

Studies conducted by the international research firm of Frost & Sullivan, Inc., point to several market areas in which military spending may increase notably over the next several years.

Due in part to the administration's emphasis on strategic strength to counter the perceived Soviet threat, military spending for reconnaissance and surveillance is expected to increase nearly 50 percent by the beginning of FY 1989. The growth will most favorably affect the space and space-based surveillance market, which could expand by as much as 54 percent in the next three years and account for about 39 percent of the \$7.6 billion market.

Frost & Sullivan also projects expenditures of \$23 billion in the ground- and ship-based military radar market over the next three years, a 25-percent increase over FY 1984 levels. Ongoing efforts to assemble a 600-ship Navy and to upgrade the defense early warning system will largely be responsible for the growth. By FY

some 10 percent, while the Army's will decrease by about the same amount. These two services will account for about 50 percent and 21 percent of the military radar market, respectively. Although the Air Force is working on a new warning system that will include 13 long- and 34 short-range radars, its share is expected to hold steady at about 25 percent during the next three years.

Researchers also forecast a twofold increase in today's \$700 million power-supply device market by the end of FY 1987. (*Frost & Sullivan, Inc., news releases*)

LOGMARS shows it can be counted on

Having been put through the paces in a number of test exercises, including REFORGER 84, the Logistics Application of Automated Marking and Reading Symbolology, or LOGMARS, has proven a success. Users have found the system efficient and accurate in carrying out a variety of inventory-management activities, including cargo checking and vessel loading.

Incorporating bar coding and electronic scan reading, LOGMARS enables logisticians to load data into a computer in about one-tenth the time it took to do so using the seven-

DoD began requiring bar code marking on a vast array of items in 1982. Eventually, the requirement is expected to affect more than 50,000 U.S. manufacturers. Adoption of LOGMARS promises to reduce government inventory record-keeping costs by more than \$100 million annually. (*Military Traffic Management Command news release*: September 20, 1984; *International Resource Development Inc. news release*: November 2, 1984)

Item reutilization hits landmark level

In FY 1984, for the first time in its 12-year history, the Defense Property Disposal Service directed the effective reuse of more than a billion dollars' worth of excess and surplus DoD inventory items.

Under its reutilization program, which fosters the use and reuse of property no longer needed by one unit or agency but of value to another, the service was able to redistribute internally items having a cumulative acquisition value of \$1.056 billion. Additionally, the organization's public surplus and scrap sales programs netted \$95 million, which has been deposited in the U.S. Treasury.

Headquartered in Battle Creek, Michigan, the Defense Property Disposal

Agency. (*DPDS news release*: December 7, 1984)

The "right stuff" for managers

What does it take to be a successful manager? From an analysis of 5,000 employee opinions on the subject, Harbridge House, Inc., derived ten factors critical to success:

1) An ability to establish and communicate clear goals, both for groups and individuals.

2) Two-way communication that is candid, honest, and direct.

3) A supportive attitude toward people and a willingness to coach them.

4) A focus on recognition of individuals for good performance rather than for seniority or personal relationships and less emphasis on criticism for poor performance.

5) Establishment of ongoing controls, including follow-up on important actions and feedback concerning performance.

6) Selection of the right people to staff the organization.

7) An awareness of and appreciation for the financial implications of decisions.

8) Receptiveness to innovation and new ideas.

9) Decisiveness once the time for employee input and debate has passed.

10) A level of integrity that inspires employee re-

Logistics Support Analysis Workshop

Feb 19-21 Los Angeles, CA

CONTACT: (205) 539-3800

*Society of Logistics Engineers,
303 Williams Avenue, Suite 922,
Huntsville, AL 35813*

Subcontract Management and Advanced Purchasing Techniques

Feb 25-Mar 1 Los Angeles, CA

Mar 25-29 Washington, DC

Government Contract Law

Mar 20-22 San Francisco, CA

CONTACT: (818) 966-4576

*The American Graduate University/
Procurement Associates, Inc.,
733 N. Dodsworth Avenue, Covina, CA 91724*

Contract Quality Assurance

Mar 4-8 Boston, MA
Mar 25-29 Atlanta, GA
May 13-17 Philadelphia, PA
May 17-21 Denver, CO
May 20-24 San Francisco, CA

Government Contract Administration

Apr 29-Mar 3 Washington, DC
May 6-10 Fort Worth, TX
May 13-17 Atlanta, GA
May 20-24 Boston, MA

CONTACT: (703) 557-0885

*U.S. General Services Administration
Training Center, P.O. Box 15608,
Arlington, VA 22215-0608*

Spring National Conference on Software Quality and Productivity

Mar 7-8 Williamsburg, VA

Fifth Annual Conference on Personnel and Training Factors in Systems Effectiveness

May 7-9 San Antonio, TX

CONTACT: (202) 393-3620

*National Security Industrial Association,
Dept. TR, Suite 901, 1015 15th Street, N.W.,
Washington, DC 20005*

CONTACT: (714) 549-4773

*Decision Planning Corporation
3184-A Airway Avenue, Costa Mesa, CA 92626*

Advanced Classification Workshop

Mar 11-13 Washington, DC

Supervisory Skills for Personnelists

Apr 2-4 Washington, DC

Fundamentals of ADP Project Management

June 11-14 Washington, DC

CONTACT: (202) 447-7124

*Graduate School, USDA,
600 Maryland Avenue, S.W., Room 106,
Washington, DC 20024*

Management Skills and Techniques for New or Prospective Women Supervisors

Mar 20-22 Atlanta, GA

Mar 25-27 San Francisco, CA

May 15-17 Chicago, IL

CONTACT: (518) 891-0065

*American Management Associations,
135 West 50th Street, New York, NY 10020*

Managing Performance

Mar 12-14 Washington, DC

June 4-6 Washington, DC

Program Evaluation Methods

Mar 18-22 Washington, DC

June 3-7 Washington, DC

Seminar in Managerial Effectiveness

Mar 18-22 Washington, DC

June 3-7 Washington, DC

Public Managers Workshop

May 6-8 Washington, DC

July 8-10 Washington, DC

CONTACT: (202) 632-5671

*U.S. Office of Personnel Management,
Washington Management Institute,
P.O. Box 988, Washington, DC 20044*

Joint Government/Industry Symposium on Physical Security (SECRET—U.S. ONLY)

Apr 9-11

Geophysical Research Board Science and Engineering